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# TRANSACTIONS

OF THE

# LINNEAN SOCIETY.

VOLUME III.

LONDON:

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TRANS-

# TRANSACTIONS

OF THE

# LINNEAN SOCIETY.

## I. *Observations respecting some rare British Insects. By the late Mr. William Lewin, F. L. S.*

*Read November* 5, 1793.

### 1. Sphinx apiformis. *Linn.*

Tab. 1. Fig. 1—5.

THE *larva* of this insect feeds in the bark of the poplar tree, near the bottom, and changes to a *pupa* in April in the cavity it has eaten out, enclosing itself in a case formed of small pieces of the wood. The perfect fly comes forth in June. The male may be readily distinguished by its anus being slightly tufted. The margins of its wings are also darker, and not near so broad as in the female, which is moreover the larger of the two.

I have found these *larvæ* of different sizes in March. I took two of the smallest, and, making a hole in the bark of a lime tree, put them in and enclosed them. The following spring they were found arrived at their full size, and they afterwards changed to *pupæ* at

the uſual time. They had fed only on the inner part of the bark, without touching the wood, juſt as they do in their uſual food the poplar, though the lime tree bark is not half ſo thick.

This ſpecies is diſtinguiſhed from the following by its mode of life, and difference of colour. It is alſo much bigger. The head is wholly yellow, the pectinated part of the *antennæ* orange, and the markings on the thorax much larger than in the *crabroniformis*, and nearly ſquare. Neither is the whole inſect of ſo dark a hue.

TAB. I. Fig. 1. Repreſents the male Sphinx apiformis.
2. The female.
3. The *larva* in its natural ſituation.
4. Pupa.
5. The ſame encloſed in its caſe.

2. SPHINX crabroniformis.

*The Lunar Hornet.*

TAB. I. Fig. 6—10.

Sph. abdomine flavo inciſurarum marginibus atris, thorace nigro maculis obſoletis flavis, capite nigro baſi annulo flavo.

The *larva* feeds on the wood of the ſallow, *Salix Capræa*, in the heart of which it ſpins itſelf up in November, but does not change to a *pupa* till May following. The fly comes out in the middle of July.

This *larva* enters the wood near the ſurface of the ground, ſometimes from the root, and feeds upwards (generally in the pith) for the ſpace of ſix or eight inches; after which it turns its head downwards, and ſpins itſelf up with the web, there waiting the proper time to change.

From

From ſeveral years attention to this ſubject, I think the caterpillar does not enter the wood till the ſecond year of its own age; as among all the numerous *larvæ* I have found from June to November, I could perceive but a ſlight difference in ſize. Probably therefore they may feed on the tender bark of the ſallow root the firſt year after they are hatched; and it ſeems they eat into the wood about June.

TAB. 1. Fig. 6. Is the male Sphinx crabroniformis.
7. The female.
8. The caterpillar in its proper ſituation.
9. The pupa, its head turned downwards.
10. The web cloſing the orifice, by which the animal had entered and muſt come out.

3. PHALÆNA Trifolii.

Bombyx Trifolii. *Fab. Mant.* 112.

*The Graſs Egger Moth.*

TAB. 2. Fig. 1—4.

Its caterpillar feeds on Trefoil, and changes to a *pupa* in June. The fly comes forth the latter end of Auguſt.

Theſe *larvæ* are to be met with on the uncultivated graſſy chalk-hills of Kent, particularly near Darent wood. They ſecrete themſelves under ſtones in the day, and come forth to feed in the evening.

The male fly has broad pectinated *antennæ*, a light coloured bar on the upper and under wing, a ſlender body, with a ſilky tuft at the anus. The *antennæ* of the female are indeed pectinated, but not to be perceived without a magnifier. It has only a faint bar on the upper wings, without the leaſt ſign of any on the under. The body is much larger, and terminates without a tuft.

TAB. 2. Fig. 1. Phalæna Trifolii, male.
2. Female.
3. Caterpillar.
4. *Pupa* in its caſe.

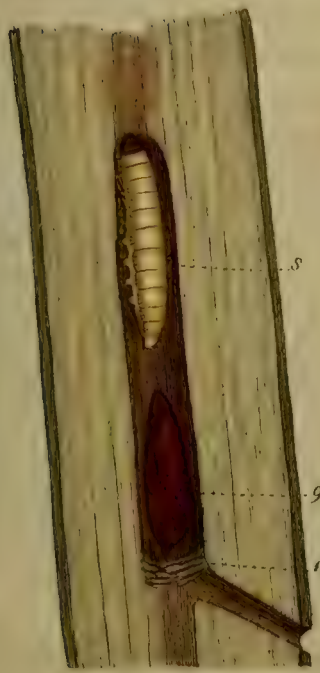
4. ICHNEUMON chryſopus.

TAB. 2. Fig. 5.

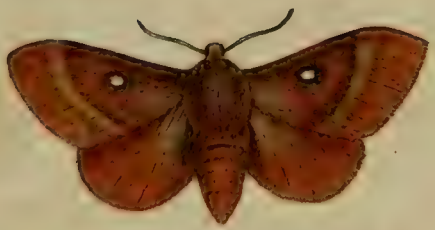
Ichn. thorace maculato, ſegmentorum abdominalium omnium marginibus pedibuſque flavis*.

In 1790 I kept two *pupæ* of the above deſcribed *Phalæna*, from which the moth did not appear at the uſual time, from Auguſt to the following May, when they produced this *Ichneumon*. I only bred two of them; and I conceive that here figured to be the female, as it is the largeſt. The other is in the cabinet of Mr. William Jones, F. L. S.

* DESCR. D. Marſham. *Antennæ* ſetaceæ, flavæ. *Thorax* niger, flavo variè maculatus; ſcilicet lineola ante alas; ſub ortu alarum punctum flavum. *Scutellum* nigrum, punctis quatuor flavis. Pone ſcutellum punctum flavum utrinque. *Abdomen* nigrum, marginibus ſegmentorum flavis. *Pedes* flavi; femoribus baſi nigris.



1–5 *Sph. apiformis.* 6–10 *Sph. crabroniformis.*



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1—4. *Ph. trifoliï.*

5 *Ichneumon chrysopus.*

II. *A curious Fact in the Natural Hiſtory of the Common Mole,* Talpa europæa, *Linn. By Arthur Bruce, Eſq. Secretary to the Natural Hiſtory Society of Edinburgh.*

*Read June 2, 1793.*

THAT the mole does, in common with other quadrupeds and man, poſſeſs that ſpirit of curioſity which prompts to emigration and even to tranſmarine expeditions, I found out laſt ſummer from the beſt authenticated facts.

In viſiting the Loch of Clunie, which I often did, I obſerved in it a ſmall iſland at the diſtance of 180 yards from the neareſt land, meaſured to be ſo upon the ice. Upon the iſland, Lord Airly, the proprietor, has a caſtle and ſmall ſhrubbery. I obſerved frequently the appearance of freſh mole-caſts, or hills. I for ſome time took it to be the water-mouſe, and one day aſked the gardener if it was ſo? No, he ſaid, it was the mole; and that he had caught one or two lately. But that five or ſix years ago he had caught two in traps; and for two years after this he had obſerved none. But about four years ago, coming aſhore in a ſummer's evening in the duſk, the 4th or 5th of June, 10 o' clock P. M. he and another reſpectable perſon, Lord Airly's butler, ſaw at a ſmall diſtance upon the ſmooth water ſome animal paddling to, and not far diſtant from the iſland. They ſoon, too ſoon! cloſed with this feeble paſſenger, and found it to be our common mole, led by a moſt

aſtoniſhing inſtinct from the neareſt point of land (the caſtle hill) to take poſſeſſion of this deſert iſland. It was at this time for about the ſpace of two years quite free from any ſubterraneous inhabitant; but the mole has for more than a year paſt made its appearance again, and its operations I was witneſs to.

In the hiſtory of this animal I do not at preſent recollect any fact ſo ſtriking; eſpecially when we conſider the great depth of the water, both in ſummer and winter—from ſix to ten, fifteen, and ſome places as deep as thirty or forty feet, all round the iſland.

*Edinburgh,*
*April* 26, 1793.

III. *A Hiſtory of Three Species of Caſſida. By the Rev. William Kirby of Barham, A. L. S.*

*Read January 7, 1794.*

CONVINCED of the truth of Mr. Marſham's obſervation *, that in order to form a complete ſyſtem of entomology, we ought to be acquainted with the hiſtory of the different ſtates of each particular inſect; I take the liberty of offering to the Linnean Society an account of three ſpecies of *Caſſida*, which I have had an opportunity of tracing through all their various metamorphoſes.

The inſects of the *coleopterous* claſs in general are little known in their previous ſtates, on account of the difficulty of diſcovering their natural ſituation, and proper food. Yet this difficulty does not extend equally to all of them; for thoſe of which I am about to give the hiſtory, require leſs attention to nouriſh, and bring to their perfect ſtate, than moſt even of the *lepidopterous* inſects: there is no danger of their eſcaping, even though they be not confined in a box. All that the breeder has to do, is to put a piece of the plant upon which he diſcovers them into a phial of water, taking care to ſupply them with freſh food when neceſſary, until he finds that they are preparing to change into the *pupa* ſtate, which he may eaſily know by their ceaſing to feed, and by their caſting off the covering of excre-

* See his ingenious obſervations upon the *P. B. Lubricipeda* of *Linneus*, Linn. Tranſ. vol. i. p. 68.

ment:

ment under which they are concealed: then he is to take the leaf to which they have fixed themſelves, and put it under a glaſs until the *imago* is diſcloſed, which will be in ten or twelve days.

I ſhall begin with ſome preliminary obſervations, that extend to all the ſpecies which I have had an opportunity of obſerving.

The larvæ of this genus are all ſurrounded with marginal radii, and theſe radii are uſually ciliated, ſo as to give the inſect, *ſub lente*, a very ſingular and elegant form. They are alſo remarkable for being *merdigerous*, and for this purpoſe are furniſhed with ſome long ſtiff briſtles juſt above the anus, upon which they depoſit their excrement; and thus form a covering, not indeed very delicate, which I imagine ſerves to conceal them from the birds, and which I remember that accurate obſerver Reaumur noticed in the *C. viridis*. This ſhield, by means of the above-mentioned briſtles, the little animal has the power of elevating or depreſſing; ſo that ſometimes it ſtands at a right angle with the body, and at others is ſo cloſely applied to it, as to conceal the inſect from any but an entomological eye.

In the *pupa* ſtate, the head of theſe inſects is encloſed in a ſhield, fringed with marginal radii. The abdomen is radiated like that of the larva, and is furniſhed with four *ſpiracula* on each ſide. It fixes itſelf by means of the *exuviæ* of the larva. The *imago*, when it diſcloſes itſelf, makes its way through a tranſverſe fiſſure of the ſhield.

1. LIRIOPHORA. C. nigra ſupra viridis, thorace emarginato, elytrorum futurâ baſibus interne punctiſque duobus nigris.

*Larva.* Viridis, colore dilutiori punctata: radii lividi: caput nigrum, regione intra oculos viridi-nigro punctata.

*Pupa.*

*Pupa.* Saturate viridis ſpiraculis albis: clypeus emarginatus, reſpectu corporis latus: abdominis radii ovati acuminati.

*Imago.* Caput nigrum: antennæ ſubclavatæ, pallidæ, apicibus nigris: thorax ſubemarginatus, viridis, punctulatus: elytra viridia, macula longitudinali communi, quæ utrinque ad eorum inſertionem dilatatur, atque florem lilii cujuſdam non injucunde refert, punctiſque nigris: ſcutellum viride: abdomen nigrum ano pallido: pedes pallidi femoribus nigris.

Sequenti ſimillima, differt tamen non ſolum maculis elytrorum, ſed etiam larvâ viridi, nec lividâ: pupæ clypeo emarginato nec integro: item imaginis thorace emarginato.

Nomen ſuggeſſit D. Præſes. Habitat in Serratula arvenſi.

2. VIRIDIS? C. nigra ſupra viridis, thorace integro.

*Larva.* Cinerea radiis nigris: caput nigrum: anus obtuſe acuminatus: ſpiracula utrinque octo nigra.

Adhuc juvenis radii lividi, dorſique medium vireſcit.

*Pupa.* Fuſco pallidoque varia: clypeus integer: abdominis dorſum utrinque lineis duabus punctorum nigricantium, quorum interiora majora: ſpiracula quatuor alba.

In pupæ exuviis albeſcunt radii.

Habitat in Serratula arvenſi.

*Obſervationes.* An hæc ſpecies revera ſit C. viridis perill. Linnei plurimum

plurimum hæreo: illius enim larva ſecundum Schrankium (Enum. Inſ. Auſtr. 92.) viridis eſt, hujus autem cinerea. C. viridis in plantis verticillatis et Carduis habitare perhibetur; hanc nunquam inveni vel in plantis verticillatis vel in Cárduis, ſed ſolummodo in Serratula arvenſi, quâ frequentiſſima deprehenditur ineunte Auguſto. Litem dirimant entomologi cordati.

3. MACULATA. C. nigra ſupra viridis; elytris rarius: ſutura dorſali confertius: nigro maculatis.

*Larva.* Viridis, maculâ dorſali oblongâ nigrâ, lineis duabus longitudinalibus, parallelis, flaveſcentibus, ornatâ; has lineas contrahit vel dilatat animal dum paſcit: caput nigrum linea viridi in tres lineolas exeunte: cauda biſeta ſetis faſciculo ſpinularum coronatis. Hunc faſciculum deponit inſectum in pupam converſurum.

In hac ſpecie ſtercus, quod admodum ſingulare, ramoſo filamentoſum eſt.

*Pupa.* Viridis puncto utrinque nigro.

Puparum exuviæ niveæ, punctis nigris reſtantibus.

Habitat in Inulæ dyſentericæ foliis.

*Obſervationes.* Huic ſpeciei quamplurimis ſimillima Caſſida Murræa perill. Linnei. Maculæ in utraque ſibi invicem adamuſſim reſpondent, adeo ut varietatem C. maculatæ, C. Murræam crediderit D. Geoffroyus. Habitat hæc in Inula dyſenterica, illa in Helenio. E pluribus larvis a me captis ne

ne una quidem C. Murræa excluſa eſt. Determinent feliciores entomologi quibus larva poſterioris arrideat. In Helenio quærenda. Imago ſemel mihi lecta in prato quodam, ſemel etiam ab amico J. Coyte Gippovicenſi entomologo ingenioſo.

IV. *Obſervations relating to the Migration of Birds. By Edmund Lambert, Eſq. of Boyton near Heyteſbury, Wilts. In a Letter to William Markwick, Eſq. F. L. S.*

*Read April* 1, 1794.

SIR,

MY ſon A. B. Lambert put lately into my hands the Tranſactions of the Linnean Society I could not help admiring your Remarks on the Migration of Birds; and as I am an old ſportſman, and have ſpent much of my time in the fields and woods, I have not been wholly inattentive to the migration of the feathered race, and therefore take the liberty of making a few remarks on ſome of the birds, which you mention as having eſcaped your obſervation.

*The Swallow.*

I have ſeen ſwallows the laſt week in March at Stowey, near the Briſtol channel, Somerſetſhire; and the laſt I ſaw was the 22d of November 1782. I obſerved two or three flying every day under the cliffs at Exmouth for a week: I left the place the 23d, otherwiſe I might have ſeen them later.

*Goatſucker.*

This bird flies late at night, and therefore is ſeldom ſeen. It lives chiefly on moths. Mr. Seymer, of Harford, Dorſet (a great naturaliſt),

raliſt), has complained to me of this bird; for, when he was ſometimes on the point of catching a fine moth late in the evening (10 o'clock), this bird would come as ſwift as lightning and ſnap it up before him. I have ſhot two of theſe birds.

*Woodcock.*

The woodcock I once ſaw the firſt of October, N. S. in this inland county; and a couple was ſhot this preſent ſeaſon that very ſame day on ſome heath about three miles from my houſe. But a perſon living at Uphill, the neareſt point of land to the Steep Holms in the Briſtol channel, and who rented that little iſland for the uſe of fiſhing, aſſured me he never knew the month of September paſs without ſeeing woodcocks on that iſland. I have had two neſts in my wood; the laſt was in the year 1789. It had four eggs. The old bird was loth to get out of the neſt; as ſhe had ſat, as near as I could gueſs, about a fortnight. I took one of the eggs and blew it, and have it by me now. But I do not believe the young ones are ever bred up in this country to be ſhot at, as you have heard: for Mr. Seymer had one lived all the ſummer in a coppice near his houſe; and though it was a place well calculated to maintain a bird that lived on ſuction, yet the bird loſt almoſt all his feathers, and could not fly for ſome time, ſo that it was often caught: but in the autumn it recovered its feathers and ſtrength, and flew away. This I had from Mr. Seymer himſelf, and other gentlemen whom he uſed to ſhew the bird to.

*Snipe.*

The ſnipes breed in great numbers on the bogs in the New Foreſt, Hants; and always come to us in September, and ſometimes in Auguſt. Some years ago two neighbours ſent me five couple the ſecond week in Auguſt, telling me at the ſame time they never ſaw them

them more plentiful in winter. I went out the 15th myſelf, and killed three couple in a little time; and the weather being extremely hot, I was obliged to come home before I intended it. They were in as good condition as in winter.

*Royſton Crow.*

The Royſton crows are very plentiful with us all the winter, though an inland county. They lay on the downs, and frequent ſheep-folds and highways; the latter, to pick the horſe-dung dropped on the roads. I never obſerved the time they go and come.

*Fieldfare.*

The lateſt fieldfare I ever ſaw was the 1ſt of May in Dorſetſhire; and the earlieſt the 29th of September, which was killed by my game-keeper.

*Redwing.*

The redwing makes its appearance in this country generally before the fieldfare, and leaves it ſooner.

*The Land Rail.*

This makes its appearance the laſt week in April, and leaves us the ſecond week in October. They breed with us, and I believe every where in England. I have taken the eggs and caught the young ones of all ſizes; for when the dog points at them they will not fly till full grown, and then reluctantly, eſpecially in the ſpring. They are continually making a creaking noiſe all the ſpring in the fields and graſs grounds. I had one making that noiſe in my garden laſt ſpring for three weeks. They call them in Ireland corn creaks.

*Water*

*Water Wagtail.*

The water wagtail moſt certainly remains with us during the winter. I had three during this whole winter about the hot-houſes and green-houſe, catching flies in warm days; but in cold weather they get down to the river, and eat the inſects on the weeds which appear when the water is turned out of its courſe to water the meadows. I have ſeen all my life-time as many water wagtails in the winter as in ſummer; in the former at the river, and the latter about the houſes.

You may depend on the truth of the above account; and I have nothing more to add, but that my obſervations on the other birds you mention totally agree with yours.

I am, Sir, with great reſpect,

Your obedient Servant,

EDMUND LAMBERT.

*Boyton, near Heyteſbury, Wilts.*

I forgot to mention the rook's antipathy (as you obſerve) to the raven. The truth is, a raven will not ſuffer any bird to come within a quarter of a mile of its neſt, being very fierce in defending it. Beſides, they take the young rooks out of their neſt to feed their own. This I was an eye-witneſs to at Mr. Seymer's; for there was no peace in the rookery night nor day, till one of the old ravens was killed and the neſt deſtroyed. A raven has built in a large beech tree of mine time out of mind. I can trace it back above an hundred years. The tree is ſuppoſed to meaſure at leaſt ſeven tons.

V. *Account of the Canis Graius Hibernicus, or Iriſh Wolf Dog, deſcribed in Pennant's Hiſtory of Quadrupeds, 3d edit. vol. i. p.* 241. *By A. B. Lambert, Eſq. F. R. and F. L. S.*

*Read April* 1, 1794.

THIS drawing of the Iriſh wolf dog was given me by Lord Altamont; done exactly the natural ſize of one in his Lordſhip's poſſeſſion, at Weſtport, in the county of Mayo, Ireland, during my ſtay there in 1790. I had frequent opportunities of obſerving theſe dogs; Lord Altamont having eight of them, the only ones now in the kingdom. There is a man employed on purpoſe to take care of them; as they are with difficulty bred up and kept healthy.

I took the meaſurement of one of the largeſt, which is as follows: From the point of the noſe to the tip of the tail, ſixty-one inches; tail, ſeventeen and a half long; from the tip of the noſe to the back part of the ſkull, ten inches; from the back part of the ſkull to the beginning of the tail, thirty-three inches; from the toe to the top of the fore-ſhoulder, twenty-eight inches and a half; the length of the leg ſixteen inches; from the point of the hind-toes to the top of the hind-ſhoulders, thirteen inches; from the point of the noſe to the eye, four inches and a half; the ears ſix inches long; round the wideſt part of the belly (about three inches from the fore-legs) thirty-five inches; twenty-ſix inches round the hind-part,

Linn. Trans. III. tab 3. p. 17.

Scale of feet

Irish Wolf Dog

part, cloſe to the hind-legs; the hair ſhort and ſmooth; the colour of ſome brown and white, others black and white.

They ſeem good-tempered animals; but, from the accounts I received, are degenerated in ſize. They were formerly much larger, and in their make more like a greyhound.

TAB. 3. repreſents the Iriſh wolf dog on the ſcale of one inch and a half to a foot.

## VI. *The Botanical Hiſtory of Mentha exigua. By James Edward Smith, M. D. F. R. S. P. L. S.*

*Read June* 3, 1794.

IN countries which have been the moſt completely examined with reſpect to their natural hiſtory, the ſcience is ſtill ſo far remote from perfection, that in ſome departments new productions are every day diſcovered, while in others we find ourſelves perpetually in need of correction as to nomenclature. Few nations have had their botanical productions ſo fully elucidated as thoſe of England and Sweden; yet ſuch as look a little beyond the ken of vulgar eyes, find the *Floras* of both extremely imperfect, and our own particularly has more than one plant attributed to it upon very flimſy authorities. Perhaps the inveſtigation of ſuch doubtful natives may be as profitable as the ſearch after new ones, provided we proceed cautiouſly and on ſure critical grounds. If we diſprove their authenticity we not only ſave trouble to compiling publiſhers in future, but, which is of infinitely more importance, we prevent much perplexity to honeſt practical ſtudents and collectors, who confide in ſuch writers. Theſe conſiderations induce me to inform my fellow-labourers in the botany of Great Britain, that they may for the future ſpare themſelves the trouble of ſearching for *Mentha exigua*; and this is the more incumbent upon me, as I have myſelf

in

in this inſtance been inſtrumental in leading them aſtray, by confiding too heedleſsly in my predeceſſors.

At ſome period between the publication of the firſt edition of *Species Plantarum*, 1753, and the *Centuria 2da Plantarum*, 1756 (*Am. Acad. vol.* iv. 297), Linnæus received from the late Mr. Philip Miller of Chelſea two dried ſpecimens of an apparent ſpecies of *Mentha* (mint), marked *Mentha aquatica exigua Tragi, lib.* i. *cap.* 6. Upon what authority Linnæus conſidered this as an Engliſh plant I cannot preciſely tell, nothing occurring on the ſubject in Miller's letters of that period. Probably the above ſynonym induced Linnæus to believe this was the plant ſo denominated in the third edition of Ray's *Synopſis*, *p.* 232, *No.* 2; and although he might readily perceive it was not the plant of Tragus, his figure being ſo very different, yet it might reaſonably be preſumed that Miller, by marking it ſo decidedly, knew it to be the plant of Ray, or rather of his editor Dillenius. Linnæus therefore without ſcruple quotes the *Synopſis*, and at the ſame time incautiouſly copies from thence two ſynonyms of Lobel and Fuchſius, which are both ſo diſſimilar to the ſpecimens then before him, that, with all my confidence in his accuracy, I cannot help attributing his omiſſion of the name and page of Tragus, rather to careleſſneſs than intention; for the figure of the latter is not more unlike the *Mentha exigua* than thoſe of Lobel and Fuchſius. Thus however it was introduced into the *Centuria 2da Plantarum*, and *Syſt. Nat. ed.* x. and in 1763 made its appearance in the ſecond edition of *Species Plantarum*, *p.* 806, the ſpecific character being taken from Miller's ſpecimens, ſtill preſerved in the Linnean Herbarium, duplicates of which are in the collection of Miller himſelf, at preſent belonging to Sir Joſeph Banks.

Mr. Hudſon in the mean time publiſhed the firſt edition of his *Flora Anglica* in 1762, and on the authority of the *Cent. Plant.*

mentions *M. exigua* as an Engliſh plant, adding a new edition of Lobel's ſynonym from Parkinſon, and copying the *Synopſis* for its place of growth. Whether he had afterwards found any variety of *M. Pulegium* which he took for the mint in queſtion; whether his ſcruples aroſe from neither himſelf nor his friends having ever been able to detect *M. exigua* at all; or whether, which is moſt probable, the appearance and ſmell of the ſpecimens in Sir J. Banks's herbarium decided his opinion, he inſerted *M. exigua* in his ſecond edition, 1778, as the very ſame plant with *M. Pulegium*; for, not having marked it with a greek $\beta$, it ſeems he did not even think it a variety.

Such was the ſtate of the caſe when the Linnean Herbarium arrived among us. It was often conſulted on this ſubject; and at length, in order to throw all the light upon it in my power, I publiſhed as exact a figure as I could delineate from one of the ſpecimens, in my *Plantarum Icones hactenus ineditæ*, *tab.* 38, taking the liberty to ſtrike out all the ſynonyms except Ray (I ought rather to have ſaid Dillenius), and expreſſing my doubts of even that. I mentioned a hint of Mr. Hudſon's, that the original ſpecimens might have been brought from Scotland by Houſton. But this conjecture, as will hereafter appear, is totally groundleſs.

Since the above publication I have been ſo fortunate as to acquire what appears, almoſt beyond a doubt, the real plant of Dillenius. Sir Joſeph Banks, not ſolicitous to encumber his herbarium with doubtful ſpecimens, very obligingly preſented me with a number of unſettled mints from Miller's collection. Among them is one with the following inſcription in Buddle's hand-writing:

" Mentha verticillata minima odore fragrantiſſimo. *Buddle.*

" Flores huic minutiſſimi multi in unicum communem pedicu-

" lum

" lum perbrevem, cauli per intervalla 7 vel 8 verticillatim poſiti. " Tota planta hirſutiuſcula, folia acuta, oblonga, et manibus com- " preſſa odorem ſpirant gratiſſimum, Roſæ eglanteriæ, &c.

" This is the fineſt mint to ſmell to. I found it by the New " River ſide near Stoke Newington. I ſhewed it your kinſman with " four or five ſorts more within a furlong of one another.

" I take this to be *Mentha arvenſis verticillata, folio rotundiore, odore* " *aromatico, D. Vernon. R. Syn. (ed.* 2.) 123.

" I want your opinion in this."

From a compariſon of the above writing with the paſſage in the *Synopſis* relative to the native place of the *Mentha* No. 2, I think there can be no doubt of mine being the original ſpecimen gathered by Buddle in company with Mr. Francis Dale, and ſent to the uncle of the latter, Mr. Samuel Dale, author of the *Pharmacologia*. It is moreover ſufficiently like the figures of Tragus, Lobel, and Fuchſius, and may be the *M. gentilis* of Linnæus, as Dr. Stokes conjectured; but this point is not to our preſent purpoſe. I have only to add, that it has no reſemblance to the *M. exigua*.

The latter therefore was ſtill only known from Miller's ſpecimens; but every practical botaniſt will readily conceive my joy, when in the ſummer of 1793 I found the ſame plant growing in the garden of my friend Edward Haſell, Eſq. of Ipſwich, where it was ſhewn to me as an unknown mint. It grew in an American border, and was ſaid to have ſprung up ſpontaneouſly. As this border had been furniſhed with bog-earth from the neighbourhood of Ipſwich, it was to be preſumed the roots had been introduced along with it. Here then was *Mentha exigua* reſtored to our Engliſh Flora, and I made haſte to diſtribute ſpecimens among thoſe who were ſolicitous to poſſeſs ſuch a treaſure. The flowers were not advanced enough to determine whether it were really a *Mentha*; the

root being fibrous, inſtead of creeping, was very ſuſpicious; and this circumſtance decided it to be no variety of *M. Pulegium*, though in ſmell no two plants could be more ſimilar. Roots were ſent to Mr. Fairbairn at Chelſea, and freſh ſpecimens to Mr. Sowerby, for his Engliſh Botany; but the latter were luckily not in a ſufficiently perfect ſtate to be drawn. I ſay *luckily*, for this ill-fated *Mentha* proves after all to be a non-entity; a caſual inſpection of the Linnean Herbarium having lately ſatisfied me, that it is neither more nor leſs than *Cunila pulegioides*.

Its native country is North America, from whence Kalm communicated a ſpecimen to Linnæus, now in my poſſeſſion, and at preſent accompanied by another, probably from Gronovius, referring to *Pulegium erectum, odore vehementi, flore violaceo, radice nequaquam reptatrice*, *Clayton*. Gron. Fl. Virgin. 8vo, p. 66. This plant in the 4to edition, p. 90, is made a *Meliſſa*, and a deſcription is added, which agrees well with our *Mentha exigua*. It is not however my preſent purpoſe to write a hiſtory of this plant as *Cunila pulegioides*; all I mean now to eſtabliſh is, that it has no right, under any name, to a place in our Flora Anglica; for there can be no doubt, that its ſeeds were brought to Mr. Haſell among earth from America, attached to the roots of ſome of the plants he is frequently receiving from thence, it having been ſought for in vain near Ipſwich, in the places from whence bog earth was brought to his garden. Whether it is really to be eſteemed a *Cunila*, depends upon its having two ſtamina or four. In the latter caſe it may be a *Mentha*, a *Meliſſa*, or more probably, from its habit, annual root, and appearance of the corolla, a *Satureja*; and *Satureja viminea* has, like it, the exact ſmell of penny-royal. *Cunila* is altogether an artificial genus, made up of *Thymi*, *Saturejæ*, &c. which happen to have but two perfect ſtamina.

VII. *Obſer-*

VII. *Obſervations on the Oeconomy of the Ichneumon Manifeſtator Linn. By Thomas Marſham, Eſq. Sec. L. S.*

*Read July* 2, 1794.

THROUGHOUT the whole ſyſtem of animal œconomy, there is not perhaps a more ſtriking and diſtinguiſhed feature, than the attention, care and foreſight of every parent animal for the protection and preſervation of its young. It is a property which pervades every claſs of animals, and is equally manifeſt in the moſt ferocious and the more timid, the largeſt and the moſt minute. The methods employed by each claſs and order differ as much as the animals themſelves. In the higher orders of beings which are viviparous, not to mention the human race, we find this care extended to a conſiderable time after the birth of the young, as in quadrupeds, who nouriſh their little ones with a delicate nutritious fluid, copiouſly ſupplied by nature from their own bodies, and with an anxiety and care evidently apparent to the moſt common obſerver, until they are able to provide for themſelves. The feathered tribes, which are oviparous, furniſh an extraordinary inſtance of fortitude and patience during the tedious time of incubation, and of labour and unwearied diligence in ſearch of food, after the young are hatched. As we deſcend to the lower orders, which are in general oviparous, we may readily diſcern ſtrong marks of ſagacity or inſtinct.

Reptiles

Reptiles and fiſh diſplay great penetration in the mode and ſituation in which they depoſit their eggs and ſpawn; but to the eyes of the penetrating naturaliſt, this care and attention will appear more artfully employed and more eminently conſpicuous in thoſe minute beings called inſects, who, although on a curſory view they ſeem to contradict the general remark, by never living to aſſiſt their future offspring, yet to an attentive obſerver exhibit a ſyſtem of ingenuity and contrivance ſcarcely to be credited, in ſearching out and determining a proper place for depoſiting their eggs, not only in ſafety from their numerous enemies, but alſo in ſituations where a ſufficient quantity of food is on the ſpot to ſupport and nouriſh the larva immediately on its breaking the ſhell: and ſo ſecurely and ſucceſsfully is this generally done, that it not only eludes the inquiſitive and prying eye of man, and is impenetrable to the large animals, but even defies the combined power of the elements; for ſo artful and ſagacious do theſe minute beings appear in all their operations, and ſo admirably are they furniſhed with inſtruments peculiarly adapted to each ſpecies, that one would think it impoſſible for any accident to hurt or deſtroy them. Yet ſuch is the divine law of order eſtabliſhed by the omniſcient Creator, that no animal, however minute, is permitted to increaſe beyond the bounds preſcribed. And it is therefore wiſely ordained, that the cunning, ſagacity, or inſtinct of one inſect ſhall counteract and render futile the ſkill and labour of another, ſo that the artful preſervation of one kind tends to the entire ruin and deſtruction of its neighbour, by which means an equilibrium is preſerved, and no one ſpecies preponderates. To enumerate the different genera, or deſcribe the method employed by each ſpecies that has been obſerved to ſecure its eggs, would far exceed my limits. Suffice it to ſay, that they are placed on the trunks, leaves, and even roots of trees and plants,

in

in the waters, in putrid ſubſtances, and even on living animals. We find them cloſely united with a ſtrong and firm cement round ſmall branches of trees, fixed on elegant pedicles on the leaves, covered with hair from the body of the parent, or encloſed in delicate ſilken caſes. Theſe when hatched are viſible, and their growth and wonderful operations may be ſeen and examined; but thoſe who depoſit their eggs in holes and crevices, in the bodies of animals, and even of inſects themſelves, are hatched, live, and come to perfection before they become viſible, and we are content to know them in their laſt ſtate only, and that imperfectly. The genus of inſects called Ichneumon, from which I have ſelected a ſingle ſpecies, has been ably deſcribed by the celebrated Reaumur, as far as he was then acquainted with their habits and œconomy. The whole of this genus are (if I may be allowed the expreſſion) paraſitical, that is, derive their ſupport and nouriſhment from other inſects, ſome depoſiting their eggs in the larva, others again in the pupa, and ſome even in the ovum or egg itſelf, the contents of which, minute as they are, are ſufficient to ſupport the young larvæ until their change into the pupa ſtate. Some depoſit only one egg in a place, as the Ichneumon ovulorum, and others again a great number, as Ichneumon puparum, &c. but whether the egg is placed in the pupa, larva, or ovum, the deſtruction of the foſter-parent is inevitable. The larvæ of large moths or butterflies that have been wounded by an Ichneumon, live and feed, though with evident marks of diſeaſe, until theſe paraſites are full fed, and able to change into their ſecond or pupa ſtate. To treat of each ſpecies of this genus, would fill a volume. I ſhall therefore confine myſelf to one, the Ichneumon manifeſtator, an inſect truly wonderful in its formation, and which in a diſtinguiſhing manner unites the two properties before mentioned, viz. a penetration and fore-

ſight bordering on ſagacity, in finding a ſuitable ſituation for depoſiting its own eggs, and alſo rendering futile and abortive the labour and ſagacity of another animal, who, to all appearance, had rendered its offspring perfectly ſecure.

ICHNEUMON MANIFESTATOR, Corpore atro immaculato, abdomine ſeſſili cylindrico, pedibus rufis. *Tab.* 4. *f.* 1.

On the 9th of June 1787, I diſcovered this inſect ſettling on the top of an old poſt, as I was walking in Kenſington gardens, and its peculiar appearance and extraordinary actions led me to obſerve it attentively. It moved rapidly over the top of the poſt, having its antennæ bent in the form of an arch, and with a ſtrong vibratory motion feeling about until it came to a hole made by ſome inſect, into which it thruſt its antennæ quite to the head, *fig.* 2. It remained a minute at leaſt in this ſituation apparently very buſy, and then drawing out its antennæ came round to the exactly oppoſite ſide of the hole, again thruſt in its antennæ, and remained nearly the ſame time. It next proceeded to one ſide of the hole, repeating the operation, the antennæ quivering in a ſurpriſing manner; and having now again drawn out its antennæ, turned about, and, dexterouſly meaſuring a proper diſtance, threw back its abdomen over the head and thorax, at the ſame time projecting its long and delicate tube into the hole (*fig.* 3); which when it had accompliſhed, it brought its body into a direct perpendicular ſituation, the two ſheaths of the tube ſtanding directly upright, as did the abdomen, while the tube itſelf proceeded from the anus down the under ſide of the abdomen into the hole. After remaining near two minutes in this poſture it drew out the tube, turned round and again applied its antennæ to the hole for nearly the ſame time as before, and alſo inſerted the tube in the ſame dexterous way. This operation was

repeated three times; but approaching too near, in hopes with a ſhallow magnifier to obſerve what paſſed at the end of the tube, I frightened it away. My curioſity being excited, I waited, but in vain, for the return of the fly, and had it not in my power to viſit the ſame ſpot for a week; but on the 16th of the ſame month I was amply gratified, luckily ſeeing many of them at work. They appeared to pierce the ſolid wood with their tubes, which they forced in even to half their length, conſtantly paſſing them down the abdomen between the hinder thighs, which cloſed and kept them ſtraight whenever any over-reſiſtance forced them to bend. I was ſo aſtoniſhed to ſee an inſtrument apparently weak and ſlender, able, with the ſtrength of ſo ſmall an animal to pierce ſolid wood $\frac{1}{2}$ or $\frac{3}{4}$ of an inch deep, that I attended to every motion of the inſect, hoping to diſcover in what manner it was done; and on very particular attention I obſerved, that all thoſe who appeared to pierce the ſolid wood, did it through the centre of a ſmall white ſpot reſembling mould or mildew, which on minute examination with a magnifier I found to be fine white ſand, which delicately cloſed up a hole made by the *Apis maxilloſa*, and where I have no doubt the bees' young were depoſited. In deep holes that were not cloſed, the inſect not only thruſt in the whole tube, but in ſome caſes the whole of the abdomen and poſterior legs, leaving out only the two fore-feet and wings, which it placed in contrary directions like two arms. The grooves which incloſe the tube were alſo projected up the back, with the ends appearing above the head out of the hole.

In October I ſaw another of theſe inſects on a ſtrong poſt, on Leſſneſs Heath, near Erith in Kent. It had fixed its tube before I arrived, and I waited a conſiderable time, in hopes it would withdraw it; but a gentleman who was with me being impatient, and doubting my account of it, I with difficulty forced the inſect to draw

it out, and then opened the hole, which was cloſed with a ſtiff pellet of turpentine.

Each ſucceeding year I had opportunities of ſeeing many of theſe inſects at work; but on the 23d of July 1791, I again paid very particular attention to ſome I ſaw in Kenſington gardens, but more immediately to the action of the antennæ, which they thruſt into many holes and crevices, but ſoon drew them out, not finding, I preſume, a proper ſituation for their eggs. I obſerved one with its tube inſerted into the ſide of a rail, which I watched with great attention (*fig.* 4.) It had fixed itſelf over a ſmall patch of reddiſh ſand that covered the hole of the *Apis maxilloſa*, three of its legs being placed on each ſide the ſpot; the abdomen was bent inward, ſo that the end of it was embraced by the hinder thighs, which kept it in a ſteady poſition, the whole tube being inſerted in the rail. It frequently drew out the tube about $\frac{1}{4}$ or $\frac{3}{8}$ of an inch, and thruſt it in again with great force; in the interim between theſe thruſts, I could plainly perceive a motion in the apex of the abdomen connected with the tube ſimilar to the pulſation of an artery, which motion ceaſed whenever the action of the tube took place. This pulſatory motion I conceive was occaſioned by the eggs paſſing from the body of the inſect to the tube; and I felt an inclination to ſeize the little animal at the moment and examine the tube, which is of a fine crimſon colour and ſemi-tranſparent, to ſee if an egg might remain in it: but an anxious deſire to ſee the whole of its operation prevented me; and when it had finiſhed its work and withdrawn the tube, it was too late.—Another particular inſtance of ſagacity in this little animal is worthy of remark: the grooves or caſes of the tube were as uſual projected in a ſtraight line from the abdomen; but the wind being very powerful, rendered it difficult for this delicate animal to maintain its ſituation, as theſe long caſes, which

Linn. Trans. III. tab. 4. f. 29.

*Ichneumon manifestator Linn*

which are feathered (*fig.* 5), were ſo ſtrongly acted upon by the wind as to endanger its being overſet ſeveral times. To remedy this inconvenience, it, with a wonderful dexterity, brought them down between its legs, and projected them forwards under its body toward the head, by which means it retained its ſituation ſecurely. It is now ſeven years ſince I began my obſervations on this little animal, in which time I have never been able to diſcover an Ichneumon that I could ſuſpect to be the male, and am therefore led to make theſe remarks public, in hopes ſome gentleman may have been more ſucceſsful, and by whoſe means its hiſtory may be completed.

## EXPLANATION OF TAB. 4.

Fig. 1—4. Repreſents the *Ichneumon manifeſtator* in the ſeveral poſitions deſcribed in the preceding paper.

5. The tube and its ſheaths highly magnified.

VIII. *Deſcrip-*

VIII. *Deſcription of a new Species of Opercularia. By Mr. Thomas Young, F. R. and L. S.*

*Read October* 7, 1794.

OPERCULARIA *paleata.*

CHAR. GEN. *COROLLA* monopetala, quadrifida. *Capſulæ* in receptaculum commune coalitæ.

Genus hoc facile ab omnibus aliis fructu diſtinguitur; in ordine naturali decimo octavo L. P. B. *Aggregatis* locandum; in ſyſtemate Linnæano inter Allioniam et Knautiam, interque Crinitam et Eveam editionis Gmelini: hic autem in ſynopſi peſſime ad tetracoccos refert. Pertinet ad Juſſieui claſſem undecimam, *Rubiaceas*; ordinem decimum, inter Patabeam et Eveam.

OPERCULARIA *paleata*, receptaculo globoſo paleaceo.

Hæc ſpecies a tribus aliis hujus generis a Gærtnero deſcriptis calyce paleiſque receptaculi tantum differt ut genus proprium merito conſtituere poſſe principio crediderim, nomenque *Cryptoſpermum*, quod ſemina in cryptis occulantur, impoſuerim. Monentibus autem ſummis viris, ne generum numerum jamdudum nimis magnum inconſulto augerem, conjungique hanc ſpeciem volentibus cum Gærtneri Opercullariis, donec plures congeneres innoteſcant, eorum judicio non invitus ceſſi. Certe nec nomen nec character Gærtneri bene in hanc plantam convenit; ſique poſthac quiſquam ſeparare voluerit, non male nomine Cryptoſpermi appellaverit.

Provenit

Provenit anno 1793 apud celeberrimum Curtiſium, ex humo e Nova Hollandia allata; ille cultori eximio Fairbairnio tradidit, quo curante nunc in tepidario horti Chelſeiani floret, menſe Julio et Auguſto 1794.

*Radix* perennis, fibroſa.

*Caulis* herbaceus, quatuor pedes altus, craſſitudine infra digitum auricularem, erectus, obſolete tetragonus, glaber, ſubſtriatus, ramoſus, viridis, fuſco ſtriatus: rami oppoſiti patentes.

*Folia* oppoſita, patentia, ſeſſilia, ovato-lanceolata, integerrima, acuta, aliquando acuminata, glabra, viridia.

*Stipulæ* laterales, juxta paria ſingula foliorum binæ, bipartitæ: laciniis divaricatis, reflexis, ſubulatis, vireſcentibus; ſetas ſubternas fuſcas gerentes.

*Flores* aggregati, terminales, pedunculati: pedunculo floris longitudine, ſolitarii, primo erecti, nuptiarum tempore cernui, poſtremo iterum erecti, qua bipartitur caulis prodeuntes.

*Calyx* communis hexaphyllus, foliolis patentiſſimis, ſubulatis: duobus oppoſitis longioribus, inque bracteas aliquando dilatatis, ut calyx par ſummum foliorum cum ſtipulis imitetur, pallide vireſcens. Perianthium proprium e paleis receptaculi, ſuperum, triphyllum: foliolis curvis, ſetaceo-ſubulatis, perſiſtens, pallide vireſcens, demum apice fuſcum, corolla paulo brevius.

*Corolla* univerſalis æqualis, ſubvigintiflora; propria monopetala, quadrifida, ante nuptias ovata, capſulam mentiens, deinde campanulata laciniis revolutis, minute piloſa, decidua, pallide vireſcens, apice rubicunda.

*Stamina:* Filamenta quatuor filiformia, corolla duplo longiora receptaculo inſerta, antherarum dorſo incumbentia, pallide vireſcentia; Antheræ oblongæ, baſi emarginatæ, biloculares, longitudinaliter

tudinaliter dehiſcentes, fuſco-albidæ; Pollen rotundum, pallide vireſcens.

*Piſtillum:* Germen inferum, receptaculi partem efficiens; Stilus ſimplex, longitudine corollæ, filiformis, ruber; Stigma bipartitum longitudine ſtili, filiforme, ſubtomentoſum, rubrum.

*Pericarpium:* Capſulæ uniloculares in receptaculum ſubgloboſum coalitæ, ſingulæ medio longitudinaliter dehiſcentes, ut excidant ſimul ſubquinorum partes dimidiæ inter ſe in orbem conjunctæ.

*Semen* ſolitarium, ovatum, ſcabrum, hinc ſulcatum, vireſcens.

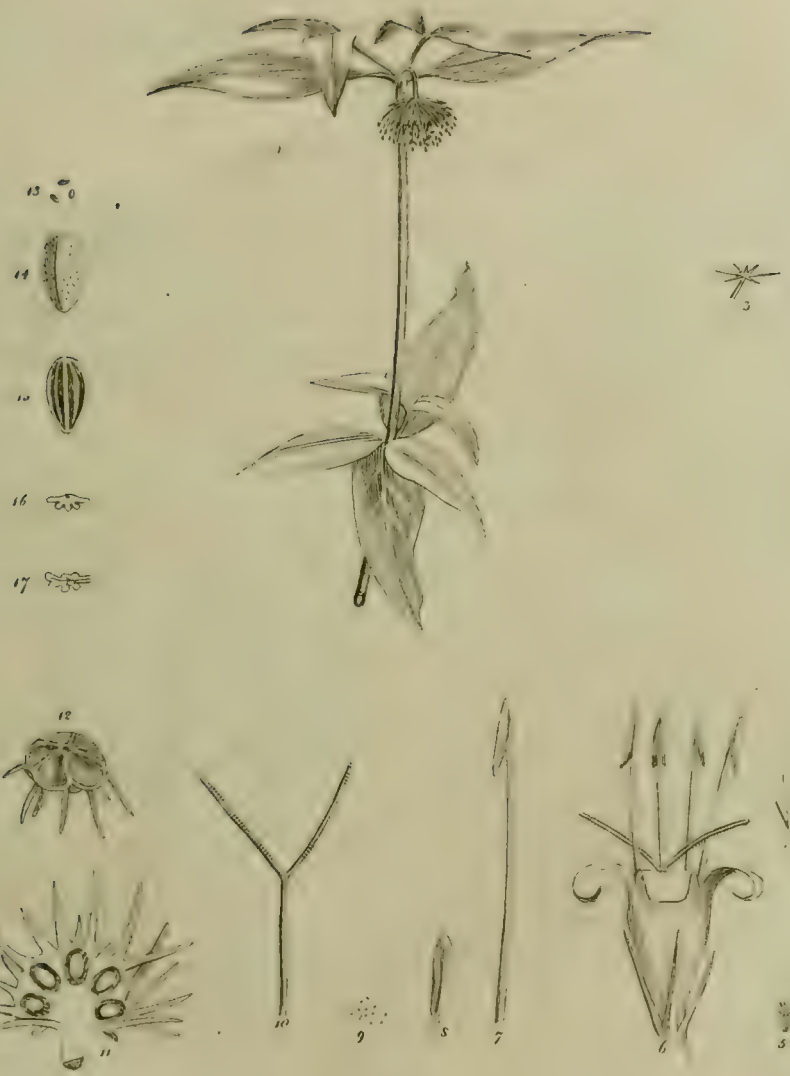
Odor et Sapor ſubnauſeoſus, velut olerum putreſcentium.

Propius accedit ad *Opercularium aſperam* Gærtneri.

## EXPLICATIO ICONIS 5.

Fig. 1. Plantæ pars magnitudine naturali.
2. Stipula aucta.
3. Calyx communis.
4. Corolla immatura.
5. Corolla matura.
6. Corolla, cum calyce proprio, ſtaminibus et piſtillo, aucta.
7. Stamen, auctum.
8. Anthera deflorata, aucta.
9. Pollen, auctum.
10. Piſtillum, auctum.
11. Fructus immaturus, auctus.
12. Pars receptaculi conjunctim cadens, aucta.
13. Semen.
14. 15, 16. Semen auctum.
17. Semen ſectum tranſverſe, auctum.

IX. *Deſcrip-*




J. Young delin.t

Opercūlaria patula.

## IX. *Descriptions of Eight new Fishes from Sumatra. By Mr. Mungo Park, A. L. S.*

*Read November* 4, 1794.

THE following paper is the fruit of my leisure hours during nine weeks stay on the coast of Sumatra: it contains a very small specimen of the ichthyological riches of that shore, and, being my first attempt, the descriptions may in many places be inaccurate.

### CHAETODON *canaliculatus*.

C. spinis omnibus canaliculatis.

B. 4. D. $\frac{13}{23}$. P. 18. V. $\frac{2}{5}$. A. $\frac{7}{8}$. C. 18.

| | |
|---|---|
| LC : A :: 66 : 26 | LC : VI :: 66 : 22 |
| LC : DI :: 66 : 18 | LC : VF :: 66 : 40 |
| LC : DF :: 66 : 60 | LC : AI :: 66 : 35 |
| LC : PI :: 66 : 16 | LC : AF :: 66 : 60 |
| LC : PF :: 66 : 27 | LC : PC :: 66 : 82 |

R. 5. P. 2. D. 2.3.4. V. 2. A. 3.4. C. 5.

*Habitat* in Sumatræ littore, supra flavo-virescens, subtus albicans guttis lævioribus adspersus, squamis minutis obovatis vestitus, carne sapida.

Oculorum iris argenteo-flava; branchiarum apertura mediocris, operculum laminâ duplici conſtans; linea lateralis dorſo parallela; anus inter pinnas ventrales, capiti propior quam caudæ; pinnæ virеſcentes immaculatæ; cauda bifida.

### CHAETODON *trifaſciatus.*

C. longitudinaliter ſtriatus, faſciis tribus capitis nigris.

B. 4. D. $\frac{13}{35}$. P. 14. V. $\frac{1}{6}$. A. $\frac{3}{21}$. C. 16.

| | | | |
|---|---|---|---|
| LC : A | :: 36 : 25 | LC : VI | :: 36 : 13 |
| LC : DI | :: 36 : 16 | LC : VF | :: 36 : 22 |
| LC : DF | :: 36 : 35 | LC : AI | :: 36 : 26 |
| LC : PI | :: 36 : 12 | LC : AF | :: 36 : 35 |
| LC : PF | :: 36 : 21 | LC : PC | :: 36 : 43 |

R. 4. D. 2.3.4. P. 2. V. 2. A. 3.4. C. 4.

*Habitat* in Sumatræ littore, inter corallia, 3 pollices longus, ſtriis 16 fuſcis longitudinalibus, ſquamis ciliatis, in trunco magnis, in capite exilibus veſtitus, faſcia nigra flavo marginata, in pinna dorſali, altera ad baſin pinnæ analis, tertia per caudæ medium inſignitus.

Oculorum iris fuſca; os perexiguum; branchiarum operculum ex duabus laminis conſtans; linea lateralis dorſo propinqua, ad finem pinnæ dorſalis interrupta; anus caudæ propior; pinnæ flavæ; cauda ſubrotunda.

PERCA

Linn. Trans III. tab 6 p. 33

Perca lunulata.

PERCA *lunulata.* TAB. 6.

*** Dorſo monopterygio, cauda bifida.

P. rubeſcens, lunula caudali nigra.

B. 7. D. $\frac{10}{24}$. P. 16. V. 7. A. $\frac{3}{12}$. C. 17.

| | |
|---|---|
| LC : A :: 64 : 41 | LC : VI :: 64 : 26 |
| LC : DI :: 64 : 27 | LC : VF :: 64 : 38 |
| LC : DF :: 64 : 53 | LC : AI :: 64 : 45 |
| LC : PI :: 64 : 22 | LC : AF :: 64 : 53 |
| LC : PF :: 64 : 40 | LC : PC :: 64 : 78 |

R. $3\frac{1}{2}$. D. 2.3. P. 2. V. 2. A. 3. C. $3\frac{1}{2}$.

*Habitat* in Sumatræ littore.

Vertex convexus nudus; mandibulæ æquales; dentes conici parum curvati, canini validi in mandibula ſuperiore; pinnæ ventrales auratæ, reliquæ rubeſcentes.

PERCA *aurata.*

P. albicans, vitta longitudinali flava.

B. 5. D. $\frac{10}{19}$. P. 18. V. 6. A. $\frac{3}{10}$. C. 18.

| | |
|---|---|
| LC : A :: 56 : 36 | LC : VI :: 56 : 24 |
| LC : DI :: 56 : 24 | LC : VF :: 56 : 37 |
| LC : DF :: 56 : 49 | LC : AI :: 56 : 37 |
| LC : PI :: 56 : 21 | LC : AF :: 56 : 47 |
| LC : PF :: 56 : 34 | LC : PC :: 56 : 75 |

R. $3\frac{1}{2}$. D. 1.2.3. P. 2. V. 2. A. 2.3. C. $3\frac{1}{2}$.

*Habitat* in Sumatræ littore.

Oculi magni iride flava; ſub oculo ſpina unica reflexa; dentes parvi acuti; branchiarum opercula anteriora pone dentata; poſteriora ſubintegra; linea lateralis dorſo propior, conſpicua, poſterius parum curvata; pinnæ pectorales pallide flavæ, cauda flava, reliquæ fuſco-albicantes.

PERCA *fumatrenſis.*

P. corpore obſcuro-argenteo, pinnis longitudinaliter ſtriatis.

B. 5. D. $\frac{12}{21}$. P. 14. V. 6. A. $\frac{3}{11}$. C. 18.

| | |
|---|---|
| LC : A :: 21 : 14 | LC : VI :: 7 |
| LC : DI :: 21 : 7 | LC : VF :: 12 |
| LC : DF :: 21 : 19 | LC : AI :: 14 |
| LC : PI :: 21 : 7 | LC : AF :: 18 |
| LC : PF :: 21 : 10 | LC : CF :: 26 |

R. 4. D. 2.3. P. 2. V. 2. A. 3. C. 4.

*Habitat* gregaria in Sumatræ littore, inter corallia, 3 circiter pollices longa, ſquamis parvis denticulatis fuſco punctatis veſtita.

Caput parvum cuneatum naſo fronteque fuſcum; oculi iride fuſco-argentea; os exiguum, mandibula inferior paulo longior; linea lateralis dorſo parallela, ad finem pinnæ dorſalis deorſum leviter inflexa; pinnæ pectorales et ventrales flavæ, reliquæ fuſcæ flavo ſtriatæ.

SCOMBER *filamentoſus.*

S. pectore nudo, pinna ſecunda dorſi et ani filamentoſa.

B. 7. D. $\frac{6}{6}$. 22. P. 19. V. 5. A. $\frac{2}{2}$. 18. C. 22.

| | |
|---|---|
| LC : A :: 66 : 38 | LC : PF :: 66 : 45 |
| LC : DPI :: 66 : 30 | LC : VI :: 66 : 26 |
| LC : DPF :: 66 : 35 | LC : VF :: 66 : 35 |
| LC : DSI :: 66 : 40 | LC : AI :: 66 : 43 |
| LC : DSF :: 66 : 62 | LC : AF :: 66 : 62 |
| LC : PI :: 66 : 20 | LC : CF :: 66 : 88 |

R. 4. DP. 2. DS. 2.3.4. P. 2.3. V. 2. A. 2.3.4. C. 4.

*Habitat* in Sumatræ littore, argenteus, ſupra cæruleſcens, ſquamis parvis perſiſtentibus tectus.

Caput anteriùs obtuſum; oculi magni; iride flava; mandibulæ dentibus parvis confertis armatæ; branchiarum opercula triplicia,

triplicia, integra, nuda; ſpinæ duæ ante pinnam analem, poſteriore majore; pinnæ flaveſcentes, dorſalis prima in foſſula recondenda, pectorales falcatæ, cauda bifida.

### Balistes *niger*.

B. dorſo triacantho, corpore nigro papilloſo, cauda ſubintegra apice alba.

D. $\frac{3}{3}$. 27. P. 14. A. 24. C. 10.

| | | | |
|---|---|---|---|
| LC : A | :: 48 : 36 | LC : PI | :: 48 : 18 |
| LC : DPI | :: 48 : 22 | LC : PF | :: 48 : 24 |
| LC : DPF | :: 48 : 29 | LC : AI | :: 48 : 37 |
| LC : DSI | :: 48 : 35 | LC : AF | :: 48 : 46 |
| LC : DSF | :: 48 : 45 | LC : CF | :: 48 : 60 |

R. 3. DP. 2. DS. 2.3. P. 2. A. 2.3. C. 3.

*Habitat* in Sumatræ littore, inter corallia.

Oculi fere verticales, oblongi, iride fuſca; aculei caudales parvi, reverſi, ſeptemplici ordine diſpoſiti; pinna dorſalis anterior niger, caudalis flavicans, reliquæ flavæ.

### Balistes *undulatus*.

B. pinna dorſali anteriore triradiata, caudæ lateribus ſpinis valde robuſtis recumbentibus, corpore nigro lineis rubris undulato.

B. 2. D. $\frac{3}{3}$. 26. P. 13. V. 24. C. 12.

| | | | |
|---|---|---|---|
| LC : A | :: 82 : 61 | LC : PI | :: 82 : 32 |
| LC : DPI | :: 82 : 36 | LC : PF | :: 82 : 40 |
| LC : DPF | :: 82 : 48 | LC : AI | :: 82 : 64 |
| LC : DSI | :: 82 : 58 | LC : AF | :: 82 : 78 |
| LC : DSF | :: 82 : 77 | LC : CF | :: 82 : 104 |

R. 3. DP. 2. DS. 2.3. P. 2. A. 2.3. C. 3.

*Habitat*

*Habitat* in Sumatræ littore.

Caput magnum, obtuſum; oculi iride fuſca; faſciæ tres rubræ, a labiis ad baſin pinnarum pectoralium excurrentes; truncus lineis duodecim rubris oblique undulatus; ſpinæ caudales validæ, anteriores glabræ, corneæ; pinna dorſalis anterior nigra, reliquæ flavæ; cauda ſubintegra.

X. *Lindſæa,*

X. *Lindſæa, a new Genus of Ferns. By Jonas Dryander, M. A. Libr. R. S. and F. L. S.*

*Read November* 4, 1794.

THE ferns belonging to this genus have ſo much the habit of *Adiantum*, that M. Aublet and Profeſſor Swartz have referred to that genus the ſpecies diſcovered by them, though they ought, according to the generic characters of Linnæus, to have been referred to *Pteris*. In examining the *Filices dorſiferæ* in Sir Joſeph Banks's herbarium, for the purpoſe of inveſtigating the membranes which cover the fructifications, I ſoon diſcovered a great difference between theſe ſuppoſed *Adiantums* and the genera of *Adiantum* and *Pteris*. In *Adiantum* the fructifications, being diſtinct ſpots, are covered by lunular membranes attached to the margin of the frond and open towards the diſk; in *Pteris* the fructifications form a line along the margin of the frond, and are covered by a linear membrane faſtened to the margin of the frond, and open towards the diſk; but in this genus the fructifications form a line parallel with the margin of the frond; in ſome ſpecies cloſe to it, in others more or leſs remote from it; but in all, the covering membrane is attached to the diſk within the line of fructifications, and opens towards the margin of the frond.

I have named this genus from Mr. John Lindſay, an aſſiduous and

and ſkilful botaniſt in Jamaica, whoſe paper on the germination of ferns, printed in the laſt volume of our Society's Tranſactions, may entitle him to be particularly remembered in treating of this order of plants. Our Preſident, with whom I communicated my determination of this genus, has already introduced it in his valuable arrangement of the *Genera Filicum Dorſiferarum*, publiſhed in the fifth volume of the Memoirs of the Academy of Turin.

LINDSÆA. *Smith in Act. Taurin.* 5. p. 413.

*Fructificationes* in linea continua, margini parallela.

*Involucrum* lineare, continuum, diſco adnatum, externe liberum.

*Habitus generis.*

E frondis vel pinnæ baſi *Nervi* omnes exeunt, dichotomi.

*Locus natalis.*

Aſia et America inter tropicos.

*Species.*

1. LINDSÆA *ſagittata*, fronde ſimplici ſagittata cordatave acuminata.

Adiantum ſagittatum. *Aubl. guian.* 964. *tab.* 366. *Lamark Encycl.* 1. *p.* 41.

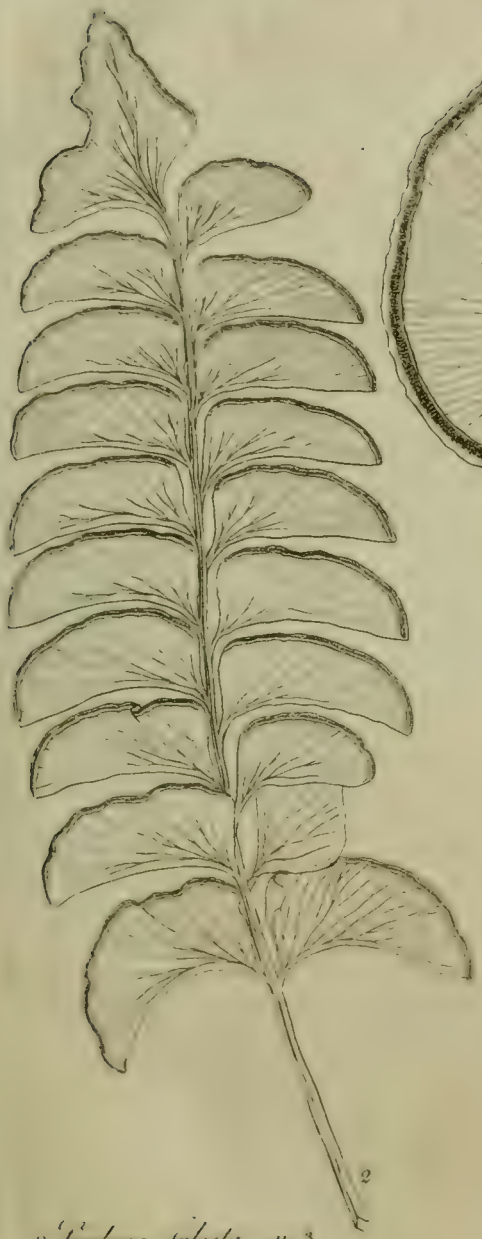
*Habitat* in Guiana Gallica. *Fuſée Aublet.*

In Sir Joſeph Banks's herbarium are ſix fronds of this ſpecies from M. Aublet, out of which only one is ſagittate; all the reſt are cordate. The character of the genus is not ill expreſſed in Aublet's figure of part of the frond, numbered 1.

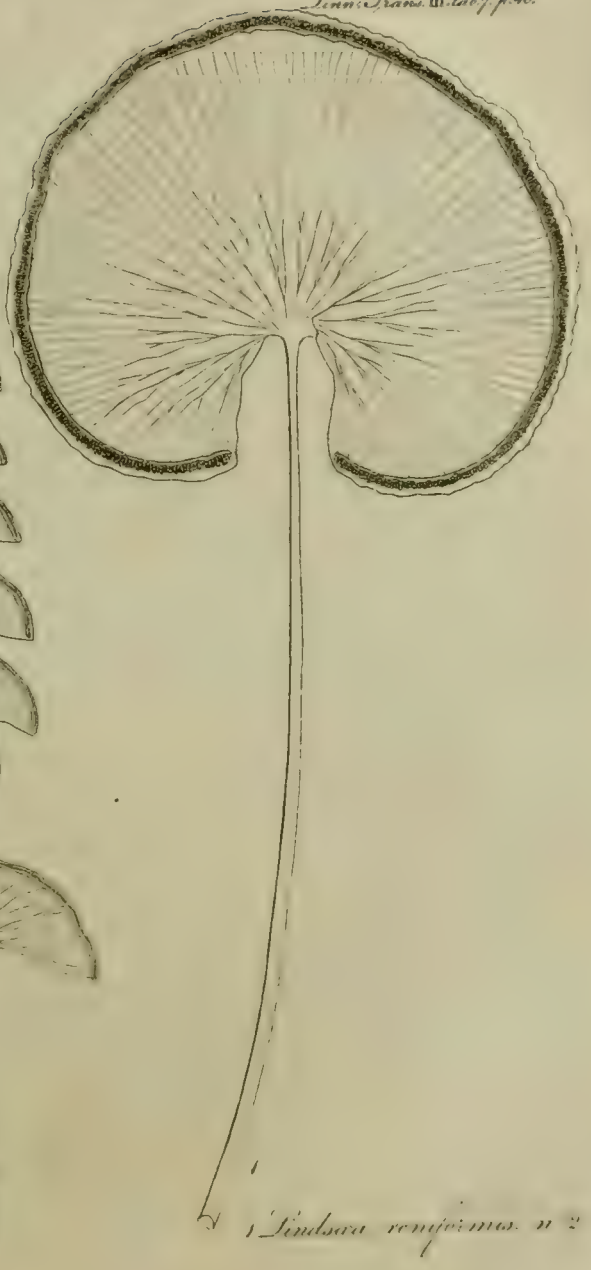
2. LINDSÆA *reniformis*, fronde ſimplici reniformi obtuſiſſima. TAB. 7, fig. 1.

*Habitat* in Guiana Belgica. *Alex. Anderſon.*

Linn: Trans. VI. tab 7 p. 40.



2 Dendsaea palmata. n. 3



1 Dendsaea reniformis. n 2

2 Lindsaea flabellulata n: 3.

1 Lindsaea heterophylla n 4

This ſpecies comes very near to the foregoing, but differs in the frond being broader than it is long, and entirely without any apex. The ſinus at the baſis of the frond is alſo more open than in the foregoing. The ſtipes is of a gloſſy brown colour, as in the firſt. In both, the line of fructifications is at a diſtance from the margin.

3. LINDSÆA *falcata*, fronde pinnata: pinnis falcatis integerrimis. TAB. 7, fig. 2.

Adiantum 7. *Aubl. guian.* 965. (excluſo ſynonymo.)

*Habitat* in Guiana Gallica. *Fuſée Aublet.*

*Stipites* dodrantales et ultra, inferne brunnei, ſuperne fuſci: angulis viridibus e pinnis decurrentibus. *Frons* vix longitudine ſtipitis. *Pinnæ* confertæ, unciales et ultra. *Fructificationes* marginales.

This fern was in Aublet's herbarium as his 7th *Adiantum*, but is not at all like the figure of Sloane he quotes.

4. LINDSÆA *heterophylla*, fronde pinnata: pinnis integerrimis ſerrulatiſve: inferioribus rhombeo-lanceolatis acuminatis; ſuperioribus rhombeis obtuſiſſimis; extimis confluentibus. TAB. 8, fig. 1.

*Habitat* in India Orientali: Malacca.—*Robertſon.*

*Stipites* vix palmares, inferne fuſci. *Frons* longitudine ſtipitis. *Pinnæ* parum remotæ, figuræ et magnitudinis diverſæ: aliæ ſeſquunciales, aliæ ſemuncia breviores. *Fructificationes* marginales.

5. LINDSÆA *flabellulata*, fronde pinnata: pinnis flabelliformibus denticulatis: adultiorum inferioribus pinnatifidis. TAB. 8, fig. 2.

*Habitat* in China, prope Canton. Dom. *Georgius Staunton*, Baronetus. In Macao. *Dav. Nelſon.* In Sumatra. *Car. Miller.*

*Stipites* palmares, fuſci, inferne brunnei. *Frons* ſtipite fere longior. *Pinnæ* remotæ ſemuncia breviores: adultiorum infimæ pinnatifidæ, unciales et ultra. *Fructificationes* marginales.

6. LINDSÆA *trapeziformis*, fronde bipinnata: pinnis patentibus lanceolatis: pinnulis trapeziformibus: infimis flabelliformibus. TAB. 9.

*Habitat* in Indiæ Occidentalis inſula Grenada. *Henr. Smeathman.*

*Stipites* inferne fuſci. *Frondes* juniores ſimpliciter pinnatæ: pinnis crenatis ſterilibus; adultiores bipinnatæ: pinnulis confertis integerrimis undulatis ſemuncialibus. *Fructificationes* intra marginem. Figura characteris generici, *Smith loc. cit. tab.* 9, *fig.* 4. e pinnula infima hujus ſpeciei deſumta.

7. LINDSÆA *guianenſis*, fronde bipinnata: pinnis patentibus ſubulatis: pinnulis inferioribus lunatis; mediis trapeziformibus; ſupremis flabelliformibus.

Adiantum guianenſe. *Aubl. guian.* 963, *tab.* 365. *Lamarck Encycl.* I. *p.* 43.

*Habitat* in Guiana Gallica. *Fuſée Aublet.*

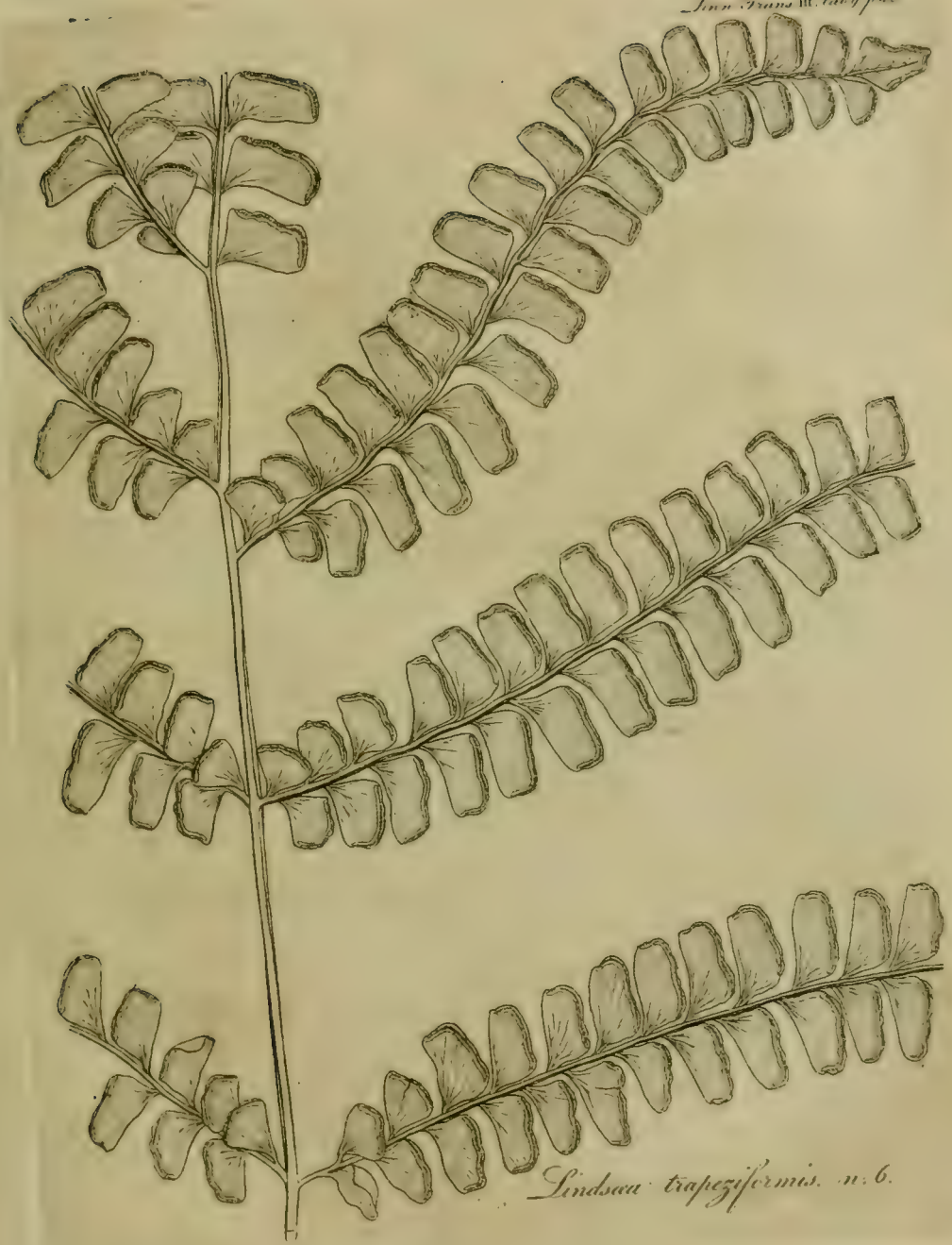
8. LINDSÆA *ſtricta*, fronde bipinnata: pinnis erectis ſtrictis: pinnulis trapeziformibus.

Adiantum ſtrictum. *Swartz proar.* 135.

*Habitat* in Jamaica. *Ol. Swartz.*

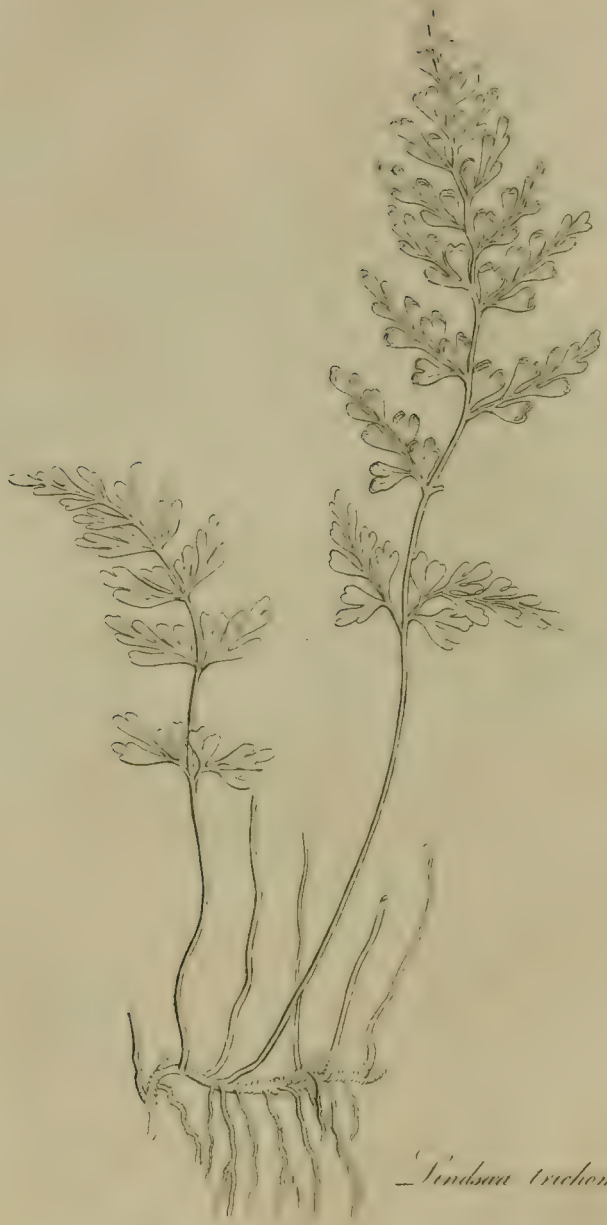
Of this ſpecies we may expect a figure and deſcription in Profeſſor Swartz's larger work on his new-diſcovered plants of the Weſt Indies.

10. LINDSÆA *tenera*, fronde tripinnatifida: laciniis obovato-rhombeis inciſis. TAB. 10.



Lindsæa trapeziformis. n. 6.

Lindsæa lunata. n. 10.



Lindsaea trichomanoides n. 9

*Habitat* in India Orientali. *Miſſionarii Societatis Unitatis Fratrum.*

*Stipites* fuſci, palmares. *Frons* longitudine ſtipitis, triangularis. *Pinnæ* infimæ bipinnatifidæ; mediæ pinnatæ; ultimæ ſimplices. *Fructificationes* marginales.

Specimens of all theſe ſpecies are in the herbarium of Sir Joſeph Banks.

## ADDITION.

In looking over the collections of plants made in the South Sea Iſlands by Mr. Menzies, I found a fern, which at the firſt appearance I took for a *Trichomanes*, according to the Linnæan diviſion of ferns, or *Davallia*, in Dr. Smith's arrangement; but, on cloſer inſpection, it evidently belonged to the genus of *Lindſæa*: and to complete my account of this genus, as far as it is hitherto known to me, I take the liberty to add this ſpecies, in ſending this paper to the preſs.

9. LINDSÆA *trichomanoides*, frondibus bipinnatis: pinnulis linearibus clavatis. TAB. II.

*Habitat* in Nova Zelandia: Duſky Bay. *Archibald Menzies.*

*Radix* repens. *Stipites* brunnei, digitales. *Frons* ſtipite paulo longior, oblonga: *Pinnulæ* infimæ inciſæ. *Fructificationes* intra marginem.

In an advanced ſtate of the fructification, the membrane which covers the capſules, ſometimes ſplits into two or three parts, and has then an appearance of *Davallia*; but in the earlier ſtage of the fructification, the continued membrane of *Lindſæa* is the more evident, as the inſertion of it is marked by a brown line acroſs the whole breadth of the pinnula.

*April* 23, 1796.

XI. *On a Species of Tellina, not described by Linnæus. By William George Maton, A. B. F. L. S.*

*Read December* 2, 1794.

A SPECIES of *Tellina* which I have lately found, does not appear to have been described, and was probably never seen by Linnæus, nor has it ever been noticed by any English writer on Conchology. A figure, however, of this shell occurs in Gualtieri's *Index Testarum Conchyliorum* (*tab.* 7, *fig.* C C); but it has been referred to by Professor Gmelin, in his edition of the *Systema Naturæ* of Linnæus, for *Tellina cornea*, though it evidently differs from the latter in shape, which Linnæus considered as one of the most certain *criteria* whereby species are to be distinguished. Gualtieri mentions the shell to which I allude as "*Musculus fluviatilis, striatus, subflavus, pellucidus*;" which is a very vague and imperfect description, and by no means sufficient to shew in what respect it differs from *T. cornea*. From a view of the specimens which I have the honour to present to the Linnæan Society, and of the figures (37, 38), I hope it may be judged not inaptly described as follows, viz.

Tellina *(rivalis)* testa oblique subovata transversim sulcata cornei coloris.

Habitat in aquis dulcibus.

Testa magnitudine pisi, rudis, sulcis latioribus, anterius planiuscula,

cula, cardinis dentibus duriuſculis, prominulis. Differt à *T. cornea* cardine verſus extremitatem, nec ad medium teſtæ.

I have generally found *Tellina rivalis* on chalky parts of the bed of the river Avon, and in rivulets communicating with it near Saliſbury; but I have never ſeen it in any conſiderable abundance, nor have I as yet heard of its being found any where elſe. There can be little doubt however, that, if diligently ſought after, it may be diſcovered in moſt rivers and ſtreams which are inhabited by *Tellina cornea*.

TAB. 13, fig. 37, repreſents the whole ſhell; 38, one valve, in order to ſhew the *cardo*, or hinge.

39, 40, repreſent *Tellina cornea*, in order that its difference from the former may be diſtinctly ſeen. Theſe laſt correſpond with *tab.* 1, *fig.* 5, of Liſter's *Appendix An. Angl.* (which is referred to by Linnæus for that ſpecies), and with *tab.* 7, *fig.* B. C. of Gualtieri's *Ind. Teſt. Conch.*

XII. *Obſervations*

XII. *Observations upon the Generic Character of Ulva, with Descriptions of some new Species. By Thomas Jenkinson Woodward, Esq. F. L. S.*

*Read December* 2, 1794.

THE introduction of a new *Alga* from the Mediterranean sea, which in fructification agrees with some of the plants arranged in the genus ULVA, but in other particulars by no means accords with the generic character, made it necessary to take a general examination and consideration of the species enumerated by different authors; in order to ascertain whether it might properly be placed amongst them, or must be considered as forming a new genus of itself. The result of this enquiry has been a thorough conviction, that the most extreme anomaly exists amongst the species at present arranged by various authors in this genus; a circumstance which cannot escape the observation of every botanical student, who may undertake the investigation and consideration of the marine plants. Under this impression the present paper has been composed, in which it is proposed to point out the impropriety of the generic character as it now stands, and to offer to the consideration of the members of the *Linnæan Society*, and through them to botanists in general, such a character as may include the different descriptions of plants at present placed in this genus. This is followed by a description of some new species.

The

The genus *Ulva* was adopted by Linnæus from Dillenius, and the character ſtands in the *Genera Plantarum* in theſe words—"*Fructificationes in membranâ veſiculari abſque fronde.*" In the *Syſtema Vegetabilium*, the eſſential character of the genus is thus given—"*Fructificationes in membranâ diaphanâ:*" and this character is adopted by Hudſon, Lightfoot, and all the Linnæan authors, notwithſtanding a great part of the plants which are arranged in this genus can by no means be conſidered as agreeing with it. Amongſt the ſpecies enumerated by Linnæus himſelf, in the *Species Plantarum*, are ſome which only agree in part with the generic character, and others which are totally diſcordant from it. Of the firſt deſcription are all thoſe ſpecies which were adopted from the *Synopſis*, *lactuca*, *latiſſima*, and the reſt, in which no actual fructification has been hitherto diſcovered; in conſequence of which it is there called "*Genus ſterile.*" Amongſt the latter are *pruniformis* and *granulata*, which are both ſphærical, and filled with a gelatinous pulp, in which no fructification has as yet been obſerved. The *Ulva pavonia* is the only one amongſt the ſpecies enumerated by Linnæus, in which fructification viſibly exiſts; and this, which can ſcarcely be ſaid to conſiſt of a diaphanous membrane, has by ſome authors been conſidered as a *Fucus*, from the circumſtance of the ſeeds being diſpoſed in ſeparate faſciæ, and not diſperſed over the whole ſurface. The *Flora Anglica* includes ſpecies which accord ſtill leſs with the eſſential character; ſome being round and fiſtuloſe, and amongſt theſe the *fiſtuloſa* is undoubtedly opake; and others filiform, amongſt which it is ſufficient to mention *plumoſa*, than which nothing can be farther removed from the generic character.

Beſides this anomaly, which might be removed by forming one or more new genera; the character is in itſelf vague and doubtful, as neither the kind, nor the preciſe ſituation of the fructification is pointed

pointed out; and ſome of the acknowledged fuci may undoubtedly be conſidered as having their fructification ſituated in a diaphanous membrane. Having ſtated theſe objections to the preſent generic character, the following is propoſed, not as a perfect one, but as leſs erroneous, and as better according with the numerous ſpecies at preſent arranged under this genus; and this principally with a view to induce others who are better qualified, to take the matter into conſideration, and at length eſtabliſh one on ſuch fixed and natural principles as may remain permanent, without need of future reviſion.

ULVA.

*Char. eſſ.* Frons membranacea ſeu gelatinoſa, fructificatio (ſi adſit) per totam frondem quaquaverſim ſparſa.

*Char. nat.* Radix nulla niſi baſis frondis paululum explanata.

Frons continua, ſimplex vel ramoſa, membranacea ſeu gelatinoſa.

Fructificatio—granula ſeu ſemina per totam frondem ſparſa, ſolitaria vel congeſta, intra ſubſtantiam vel ſub epidermide ſita.

The plants belonging to this genus adhere to the ſubmarine rocks and ſtones, to piles or planks, and not unfrequently to other plants, by an expanded diſc, a ſmall bulbiform callus, or an unformed gelatinous lump; all which are merely the baſe of the frons ſomewhat dilated. The frons is either membranaceous or gelatinous; the former is either plane or tubulous, and uſually diaphanous; the latter either filiform or compreſſed, ſolid or fiſtulous, diaphanous or opake. Amongſt the membranaceous *Ulvæ* ſome are umbilicated, and have not any viſible root, appearing to adhere to

to their place of growth by ſome point of the under ſurface. The greater part are very much attenuated immediately above the baſe, but ſuddenly dilate, and are divided into numerous ſegments, which are always of the ſame ſubſtance throughout. The filiform and compreſſed *Ulvæ* are either ſimple or branched; but the branches are merely diviſions of the frond, which may therefore ſtrictly be called continuous or uniform. The fructification of theſe is unknown, excepting only the *Ulva diaphana*, and *rubra* of Hudſon; in the former of which it conſiſts of numerous minute grains or ſeeds, diſperſed throughout the whole internal ſubſtance: the fructification of the latter has not yet fallen under the obſervation of the author. Amongſt the membranaceous *Ulvæ*, the *pavonia*, *coccinea*, *dichotoma*, *atomaria* and *ligulata*, exhibit a fructification, conſiſting of numerous minute grains or ſeeds, thickly ſcattered on both ſides immediately under the epidermis, ſometimes crowded, but moſtly ſingle. The fructification of the *lactuca*, *latiſſima*, *compreſſa*, *umbilicata*, and *laciniata* is entirely unknown.

This genus, and that of *Tremella*, ſo nearly approach each other, that it is extremely difficult to aſcertain their proper limits. The original deſign appears to have been, to conſider ſuch as were membranaceous as *Ulvæ*, and ſuch as were gelatinous as *Tremellæ*: but this diſtinction has been by no means adhered to; there being gelatinous *Ulvæ*, and membranaceous *Tremellæ*, to be met with in almoſt every author. Perhaps the beſt diſtinction would be, to conſider all thoſe which are membranaceous, and in which no viſible fructification exiſts, as belonging to the genus *Tremella*; and to arrange thoſe in which the fructification is known, and ſuch as are filiform, although without any perceptible fructification, with the *Ulvæ*. It muſt nevertheleſs be evident, that ſuch an arrangement would entirely ſubvert the genus *Ulva* as it ſtands in *Sp. Pl.* and very much

confuſe the diſtribution in *Syſt. Veget.* and in the works of other authors. For this reaſon, it is at preſent propoſed to reject from the genus *Ulva* ſuch ſpecies only as are either known to be *Fuci*, or which, from their analogy with thoſe, there are the ſtrongeſt reaſons to conclude muſt belong to that genus; and alſo ſuch as are terreſtrial and gelatinous, or which grow in freſh water, and are gelatinous, and approaching to a globular form. This will confine the genus *Ulva* to ſuch plants as are really marine, with the ſingle exception of *inteſtinalis*, which is found in both freſh and ſalt water, and has ſo great an affinity with *lactuca*, *linza*, and *compreſſa*, that it would be very improper to ſeparate them. For the better diſtinguiſhing, and the more eaſy inveſtigation, of the numerous ſpecies, they are here arranged in different ſubdiviſions in the following conciſe

SYNOPSIS SPECIERUM.

Subd. 1. Membranaceæ, fructif. adhuc incognitâ.

A. fronde planâ integrâ.

Ulva umbilicalis. *Linn.—Gm. Syſt. Nat.—Hud.—Light.—With.*
purpurea. *Gm. Syſt. Nat.—Roth. Fl. Germ.*—an var. præced. ?
plicata. *Fl. Dan. t.* 829.
latiſſima. *Linn.—Gm. Syſt. Nat.—Light.—With.*
fuſca. *Hud.*—à præcedente differt.
lanceolata. *Linn.—Gm. Syſt. Nat.—Hud.—With.*
lactuca. *Linn.—Gm. Syſt. Nat.—Hud.—Light.—With.*

B. fronde planâ pertuſâ.

Agarum. *Gm. Hiſt. Fucor.—Herb. Bankſianum.*
Clathrus. *Gm. Hiſt. Fucor.—Herb. Soc. Linn.*
reticulata. *Gm. Syſt. Nat.—Forſk. Fl. Ægypt. Arab.*

C. fronde

C. fronde tubulosâ rugosâ.

Ulva intestinalis. *Linn.—Gm. Syst. Nat.—Hud.—Light.—With.*
lumbricalis. *Linn.—Gm. Syst. Nat.*
compressa. *Linn.—Gm. Syst. Nat.—Hud.—Light.—With.*
rugosa. *Linn.—Gm. Syst. Nat.*

D. fronde cellulosâ.

labyrinthiformis. *Linn. Mant.*—An eadem est labyrinthiformis. *Gm. Syst. Nat.—Vandell. Therm.* 120. *t.* 2.?

E. fronde plicatâ.

linza. *Linn.—Gm. Syst. Nat.—Hud.—Light.—With.* Frons semel longitudinaliter plicata.

Subd. 2. Membranaceæ carpophoræ.

Ulva pavonia. *Linn.—Hud.—Light.—With.*
squamaria. *Gm. Hist. Fucor.—Gm. Syst. Nat.* An var. præced.?
atomaria. *Species nova.*
palmata. *Fucus palmatus Linn.—Hud.—With.*—Fructificatio Ulvæ.
ligulata. *Species nova.*
coccinea. *Hud.—With.*
laciniata. *Light.—With.*
dichotoma. *Hud.—Light.—With.*
calendulifolia. *Gm. Syst. Nat.—Dill.* 46. *t.* 9. *f.* 4.

Subd. 3. Gelatinosæ, fronde tereti s. compressâ, integrâ.

Ulva rubra. *Hud.—With.*
diaphana. *Hud.—With.*

Ulva flaveſcens. *Hud.—With.* An var. præcedentis?
incraſſata. *Fl. Dan.* 653. An Fucus?
decorticata. *Species nova.* Subgelatinoſa.

Subd. 4. Subgelatinoſæ, fronde tereti, tubuloſâ.

Ulva purpuraſcens. *Hud.—With.*
fiſtuloſa. *Hud.—With.*
ſobolifera. *Fl. Dan.* 356.
prolifera. *Fl. Dan.* 763. 1.
ſpongiformis. *Fl. Dan.* 763. 2.
Priapus. *Gm. Hiſt. Fucor.—Gm. Syſt. Nat.* Frons ſubulata.
glandiformis. *Gm. Hiſt. Fucor.—Gm. Syſt. Nat.*
plumoſa. *Hud.—With.* An Conferva?

Ulva papilloſa *Murr. Syſt. Veget.*—filiformis, capillaris & rubens *Hud.* are either known, or with good reaſon ſuppoſed, to belong to the genus Fucus.

Ulva incraſſata *Hud.*—criſpa, cornuta *Gm. Syſt. Nat.* and *Light.*—ſtellata, oryzæformis, moccana, cuneata *Gm. Syſt. Nat.*—pruniformis, granulata *Murr. Syſt. Veget.* and *Hud.*—and piſiformis *Reich. Syſt. Veget.* and *Hud.* may be conſidered as more probably belonging to the genus Tremella.

Ulva porrifolia *Gm. Syſt. Nat.* appears to be nothing more than lanceolata repeated.

Ulva Sagarum *Gm. Syſt. Nat.* is Tremella arborea *Hud.*

Ulva confervoides *Gm. Syſt. Nat.* is Conferva tubuloſa *Hud.*—Dill. *t.* 6. *f.* 39. as appears from an original ſpecimen of *Dillenius*, preſerved in the herbarium of Sir Joſeph Banks.

Ulva montana *Gm. Syſt. Nat.* quoted from *Swartz Nov. pl. gen. et ſp.* p. 148, belongs to the order Fungi, where it forms a new genus, approaching

approaching Boletus, but without pores, and is not unlike P. verſicolor. Whether Ulva montana *Light.* 973 be the ſame with this, or to what genus it properly ought to be referred, muſt be determined by ſuch perſons as may have an opportunity of examining it in its native place of growth.

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Ulva atomaria—fronde membranaceâ planâ dilatatâ palmata: ſegmentis linearibus ſubramoſis ſubciliatis. *Species nova.*

Radix nulla, niſi baſis frondis paululum explanata, ſuperne tomentoſa.—Frons brunnea, tenerrima, membranacea, plana, dodrantalis vel ſemipedalis, à tenui principio orta ſtatim lateſcens, et poſt paululum progreſſûs in plurimas lacinias diviſa. Laciniæ lineares, ad originem ſimplices, dein ſubramoſæ, marginibus nunc integris, nunc ciliis paucis brevibus ſurſum tendentibus obſitis.—Fructificatio—granula ſeu ſemina minutiſſima, intra utramque frondis paginam ſita, et in faſciis tranſverſim concentricis congeſta.

Inter rejectamenta maris apud Yarmouth, Norfolciæ, invenit D. Wigg.

This elegant plant was found by Mr. Wigg on the beach at Yarmouth, and is ſuppoſed to have been waſhed from the rocks, either at Cromer to the northward, or Harwich to the ſouthward of that place. The ſubſtance is membranaceous, extremely thin and delicate; the colour an earthy brown, varying in different ſpecimens, of a lighter or darker ſhade, but always having a conſiderable degree of tranſparency. The height of the largeſt ſpecimens hitherto found has not exceeded ſix or ſeven inches; the breadth about half as much. In ſome the frond is ſuddenly dilated into

into the form of an open fan, and, at an inch or inch and half from the baſe, is divided into numerous palmated linear ſegments, either ſimple or branched; in other ſpecimens, it proceeds three or four inches without being very much increaſed in breadth, and is then in th ſame manner divided. The ſegments are conſtantly ſimilar in ſubſtance to the reſt of the frond, and are either entire on the margins, or bordered with a few ſmall cilia pointing upwards. The dilated baſe, by which the plant adheres to its place of growth, is covered with a thick woolly down; the reſt is perfectly ſmooth. The fructification conſiſts of numerous minute grains or ſeeds, ſome of which are ſingle, but the greater part crowded, and diſpoſed in ſeparate faſciæ, forming parallel ſegments of circles, of which the baſe of the plant is the centre, and leaving naked ſpaces between the faſciæ. In this reſpect it correſponds with *Ulva pavonia*, but differs from that ſpecies in its thin and delicate ſubſtance, in colour nd in form.

Ulva ligulata—frondibus membranaceis planis ramoſis, ramis dilatatis ſubdichotomis ligulatis, angulis dichotomiæ obtuſioribus. *Species nova.*

Radix callus minimus bulbiformis—Frondes aggregatæ, coccineæ, membranaceæ, ſubdiaphanæ, dodrantales, vel ſemipedales—Frons ſingula à tenuiſſimo principio orta, modò ad originem modò poſt paulum progreſſûs fit ramoſa, ramis dilatatis, ſæpiùs dichotomis, angulis dichotomiæ obtuſioribus, rariſſimè trifidis vel quadrifidis.—Ramorum ſegmenta linearia, dichotoma, apicibus bifidis acutiuſculis, ligulis anguſtis obſita.—Fructificatio granula ſeu ſemina minuta intra utramque frondis paginam, necnon in ligulis quaquaverſim ſparſa ſolitaria.

Hab. in rupibus et ſaxis apud Cromer, Norfolciæ.

This beautiful ſpecies was found on the beach at Yarmouth by Mr. Wigg, at the ſame time with the preceding one; but has ſince been diſcovered growing on the rocks at Cromer, on the Norfolk coaſt. It very much reſembles ſome of the varieties of *Fucus ciliatus*, particularly that which is called by Gmelin *ligulatus*, and has doubtleſs been confounded with it; but the fructification not only proves it to be a very different plant, but alſo points it out clearly as belonging to the genus *Ulva*. It differs alſo eſſentially in never having the ligulated proceſſes, nor any part of the frond armed with cilia. This ſpecies varies very much in ſubſtance, being ſometimes found extremely thin and tender, and at others almoſt approaching to cartilaginous. The frond moſt frequently branches directly from the root, and is dichotomouſly divided throughout; but ſometimes it is entire for half its length, and then is divided, in a palmated form, into three or four ſegments, which are again branched and ſubdivided. In either caſe, the ſegments are always linear, the terminations bifid, and uſually acute, and the margins clothed with ligulated proceſſes of the ſame ſubſtance as the reſt of the frond. Immediately above the root it is always extremely narrow, proceeding as it were from a point, but is directly dilated, which gives the whole a cuneated form. The fructification conſiſts of minute dark red grains or ſeeds, always ſingle, but thickly ſcattered on both ſides of the frond.

Ulva decorticata—fronde tereti ramoſâ, ramis ſubdichotomis: apice attenuatis obtuſis. *Species nova.*

Radix nulla niſi baſis frondis paululum explanata—Frons teres, prope baſin ramoſa, 6-pedalis et ultra, 4 lineas lata—Rami longiſſimi, ſemel vel bis nec ultra dichotomi, ad baſin et ad dichotomiam compreſſi, cæterùm filiformes, apice attenuati obtuſi. —Subſtantia

—Subſtantia frondis interna cartilagineo-gelatinoſa, undique materie ſpongioſâ, granulis innumerabilibus minutis congeſtis repletâ, cooperta. Cortex exterior ſeu epidermis nulla adeſt—Color ſuperioris partis viridis, inferioris ſordidè albeſcens.

Hab. in mari Mediterraneo.

A ſingle ſpecimen only of this curious and certainly nondeſcript *Alga* was received by Mr. Wigg from the Mediterranean, along with ſome other marine plants; but of the particular place of growth he could obtain no certain information. It had ſo much the habit and appearance of *Fucus loreus*, that it was at firſt looked upon as a ſpecimen of that plant, overgrown and ſpoiled by *Fluſtra piloſa*. On putting it into water, it loſt its compreſſed, and aſſumed a round form; and it was then obſerved that the whole ſurface was compoſed of minute granulations, which had, whilſt it was dry, given it that roughneſs of appearance, but which in reality more reſembled a woollineſs or hairineſs than the *Fluſtra piloſa*. From a careful examination of it in this ſituation, the above ſpecific character and deſcription were drawn up; and from the very ſingular circumſtance of the exterior granulations appearing entirely naked, and not being covered by any outer coat or epidermis whatever, the trivial name of *decorticata* was given to it. The whole length of this particular ſpecimen is ſix feet ſix inches; the breadth of the largeſt branch, where uncompreſſed, four lines. There is no appearance of any root, but the baſe of the frond is expanded, and by this it has evidently adhered to its place of growth. Near the baſe it is branched into three or four or more parts; one of theſe is very ſhort; two others are dichotomouſly divided at about ſix inches from their origin, after which they continue ſimple to their terminations. The longeſt branch, or, as it may be conſidered, the

the principal frond, after being once divided near the baſe, continues ſimple for three feet, when it becomes dichotomous, and theſe branches then continue undivided to the end. The whole plant is nearly round and filiform, except that the branches are compreſſed at their origin, and again above and below the angles of their dichotomy. The ends of the branches are attenuated, and terminate obtuſely. In ſubſtance it differs from all other known marine *Algæ:* the central part is ſolid and cartilaginous, but at the ſame time ſomewhat gelatinous; this is every where ſurrounded and covered with a ſpongy maſs filled with minute granulations, and entirely deſtitute of any outer ſkin; in conſequence of which it retains water like a ſponge, and the whole ſurface has a rough and uneven appearance. It may perhaps be objected, that this ſpecies does not ſufficiently agree with the nat. char. the fructification appearing entirely naked: but although it has that appearance, it is in reality all imbedded in the ſpongy ſubſtance of which the greater part of the frond is compoſed, but from the want of an epidermis the exterior granulations muſt neceſſarily appear to be ſituated on the ſurface, and not beneath it. It might alſo be ſuppoſed, that the outer part containing the granulations is paraſitical, and formed upon ſome *fucus* or other plant belonging to the *Algæ*; but, beſides that no paraſite is ever known ſo entirely to cover the living plant on which it grows, that no part by which it might be diſcovered is left naked, the ſpongy matter containing the granulations ſo abſolutely proceeds from, and forms a part of, the more ſolid centre, that with the utmoſt care and attention in diſſecting it has not been poſſible abſolutely to ſeparate them, and no doubt can poſſibly remain of their forming one entire and perfect plant. The central part is green, the reſt of the internal ſubſtance whitiſh; of the ſurface, one half, which is ſuppoſed to be what in floating, or when left by the tide, is uppermoſt, is green, the other part dirty white.

From the very extended length of this plant, it is ſcarcely poſſible to give a plate which ſhall be a ſufficiently accurate repreſentation of it; but from its totally diſſimilar appearance to every other known ſpecies of *Ulva*, and from its ſimilarity in habit to *Fucus loreus*, although it is more branched towards the baſe, and much more ſimple upwards than that *Fucus*, it is hoped that the foregoing ample deſcription and hiſtory of the plant will be abundantly ſufficient to diſtinguiſh it, when it ſhall again be brought under obſervation.

XIII. *Account of a Species of Bark, the Original Quina-Quina of Peru, ſent over by Monſ. de la Condamine to Cromwell Mortimer, Eſq. Sec. R. Soc. about* 1749. *Communicated to A. B. Lambert, Eſq. F. R. S. V. P. L. S. by John Hawkins, Eſq. of Dorcheſter.*

*Read December* 4, 1794.

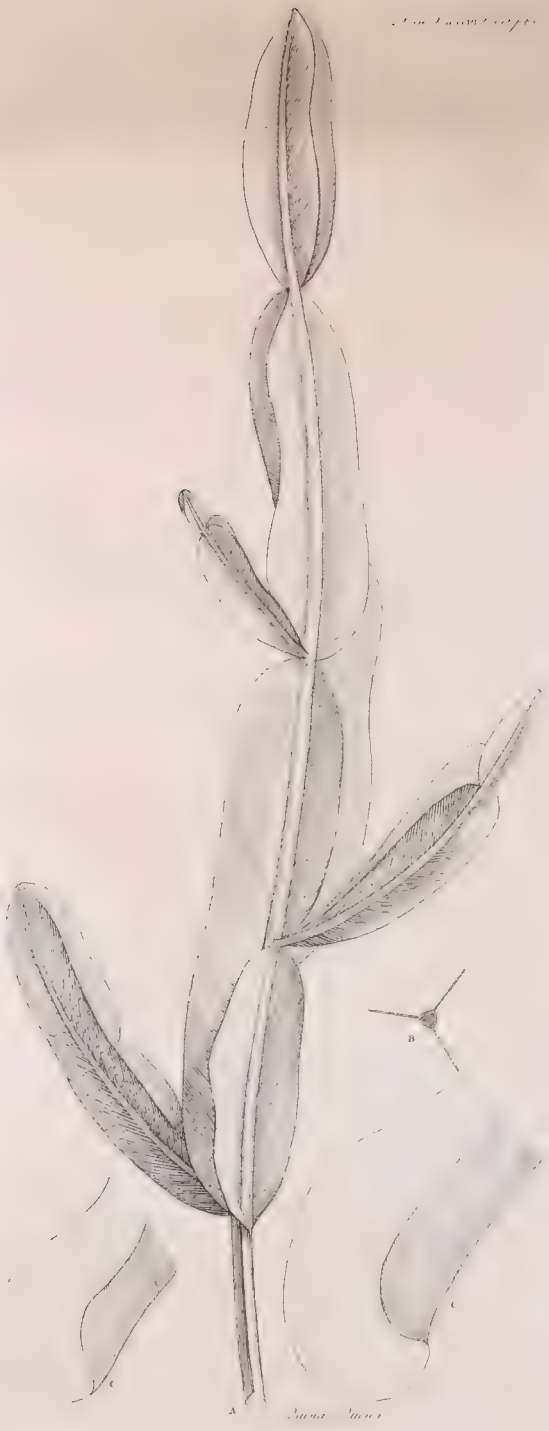
THERE is a famous tree, beſides the Peruvian bark (*Cinchona officinalis* of Linnæus), known in ſeveral provinces of South America under the name of *Quina-Quina*, and in the province of Maynas on the banks of the river Marannon under that of *Tatchi*. A fragrant reſin diſtills from the trunk by means of an inciſion. The ſeeds, called by the Spaniards *Pepitas de Quina-Quina*, have the form of beans, or of flat almonds, and are encloſed in a kind of doubled leaf, between which and the ſeed is found a little of the ſame reſin that diſtills from the tree. Their chief uſe is to make fumigations, which are reputed cordial and wholeſome, but their reputation is much leſs now than formerly.

This tree grows plentifully in ſeveral provinces of High Peru, as in the neighbourhood of Chucuiſaca or La Plata, Tarija, Miſque, Lipes, &c. The natives make rolls or maſſes of the reſin, which they ſell at Potoſi and Chucuiſaca, where they ſerve not only to fumigate or perfume with, but alſo for ſeveral other uſes in phyſic, ſometimes under the form of a plaiſter, ſometimes under that of a compound oil made from the reſin. This ſubſtance is ſuppoſed to

promote perſpiration, ſtrengthen the nerves, and to reſtore the motion of the joints in gouty people, by barely carrying in the hand and continually handling it, without any preparation, of which many inſtances are recorded. The Turks apply their *Caddarum* to the very ſame uſe.

It is wonderful, that the bark of *Loxa* (*Cinchona officinalis*) ſhould have been called in Europe, and every other part of the world except its native place, by the name of *Quina-Quina*, which name properly belongs to the tree we are mentioning, always called *Quina-Quina* by the natives, and afterwards by the Spaniards when they firſt became acquainted with it. Among the ſeveral virtues attributed to this tree, the moſt conſiderable is that of its bark, which paſſed for an excellent febrifuge, and before the diſcovery of the tree of *Loxa* was in great repute for curing tertian agues, &c. The jeſuits of *La Paz* or Chucuyapu gathered its bark, which is intenſely bitter, very carefully, and uſed to ſend it to Rome, where it was diſtributed under the true name of *Quina-Quina*, and uſed for the cure of intermittent fevers. It ſeems that the bark of *Loxa* having paſſed into Europe, particularly to Rome, by the ſame means, the new febrifuge has been confounded with the old one, and that of *Loxa* having been moſt uſed, has retained the name of the firſt, which is now-a-days almoſt entirely forgotten. The name *Caſcarilla*, or ſmall bark, given to that of *Loxa*, ſeems to have been invented in order to diſtinguiſh it from ſome other, undoubtedly the ancient *Quina-Quina*.

TAB. 12 repreſents the ancient *Quina-Quina* etched by Mr. Hawkins from the original ſpecimen in 1741, and which is here reengraved, the old plate being loſt. The ſtalk (A) is triangular, furrowed and pithy, emitting branches alternately, with a leafy wing


B
A

wing running along every angle, like a three-edged ſword-blade, terminating here and there in a rounded form. Theſe wings are thick, and curiouſly veined. When ſteeped in hot water, in order to expand them, they became covered all over with a white powdery ſubſtance (probably from the reſin which the water could not diſſolve). (B) is a tranſverſe ſection of the ſtem and leaves; (C) the ſeeds, of a brown colour and woody ſubſtance.

XIV. *Natural*

XIV. *Natural Hiſtory of Perca Scandens. By Lieutenant Daldorff, of Tranquebar. Communicated by Sir Joſeph Banks, Bart. K. B. P. R. S. H. M. L. S.*

*Read January* 6, 1795.

PERCA *ſcandens* (*Sennal*, Malab.) Nova ſpecies ſecundæ ſubdiviſionis: dorſo monopterygio, cauda indiviſa: forſan inſerenda pone ſpeciem nonam Syſt. Linnæani ex editione decimatertia; aut pone ſpeciem decimam-quintam in editione Syſtematis Linn. curante Gmelino.

*Differentia ſpecifica.*

P. pinnæ dorſalis radiis ſpinoſis ſeptendecim; muticis octo; ſquamis (ſcabris) margine denticulato albido.

*Deſcriptio.*

Palmaris; mucore tenaci nigro obducta; ſupra obſcure viridis, dein lucidior, ſubtus pallide aurea.

Os utrimque ante labia denticulatum.

Frons, poris ordinate diſpoſitis; ſquamis margine albido integro.

Oculi laterales plani; iride nitide aurea; pupilla magna nigra.

Operculum branchioſtegum ſquamoſum, ſubtriphyllum; lobo poſtico ſuperiore cincto ſpinis viginti-tribus, intermediis longioribus; inferiore ſpinis quindecim.

Pinna dorſalis complicata in foſſula dorſi abſconditur.

Pinnæ pectorales oblongæ obtuſæ; radiis duodecim.

Pinnæ ventrales ſex-radiatæ, ſubconnatæ, rubeſcentes; radio primo ſpinoſo.

Pinna analis in foſſulam corporis complicatilis; radiis ſpinoſis decem, muticis octo.

Pinna caudalis ſubrotundata; radiis ſeptendecim bifidis.

*Locus, Tempus ac Mores.*

Capta Tranquebariæ circa Id. Novemb. 1791, propriis manibus in rivulo defluente ex *Boraſſi flabelliformis* fronde in lata corticis fiſſura. Arbor ſtagno vicina. Piſcis inhærens fiſſuræ quinque pedes et ultra ſupra ſtagnum elatus ſub ipſis meis oculis altius aſcendere annitebatur. Spinis branchioſtegorum expanſorum utrinque fiſſuræ parietes attingentibus ſuſpenſus, caudam torquebat ſiniſtroſum; ſpinuliſque pinnæ analis parieti fiſſuræ adpreſſis, firmiſſime illis inſiſtens altius ſe afferebat per corporis expanſionem, branchioſtegis corpori applicatis: quibus iterum expanſis altius quam antea ſe in corticis fiſſura tenebat. Eoque modo ſpinoſos radios pinnæ dorſalis mox ad dextrum mox ad ſiniſtrum latus cortici infigens, continuebat iter, quod meis demum manibus impediebatur. Vita videtur tenaciſſima: per plures enim horas ſub tecto in ſicca arena eodem modo quo antea ſcanderat arborem obambulabat. Operculorum ſpinæ ab incolis venenatæ exiſtimantur.

XV. *The*

XV. *The ſpecific Characters of ſome minute Shells diſcovered on the Coaſt of Pembrokeſhire, with an Account of a new marine Animal. By John Adams, Eſq. F. L. S.*

*Read January* 6, 1795.

I HAVE the honour to offer to the attention of the Linnæan Society the ſpecific characters of the following minute ſhells collected in the ſea ſand on the coaſt of Pembrokeſhire, and I believe hitherto unnoticed by our Britiſh Conchologiſts.

ARCA. *Syſt. Nat.* 312.

*minuta.* A. teſta ſubrotunda: ſtriis concentricis, margine integro.
Obſ. Color albus.

BUCCINUM. *Syſt. Nat.* 33.

*breve.* 1. B. teſta quinque anfractibus: longitudinaliter coſtatis: tranſverſim ſtriatis.
Obſ. Color albus opacus, caudâ breviſſimâ. TAB. 13. *fig.* 3, 4.

*minutum.* 2. B. tribus anfractibus: longitudinaliter coſtatis.
Obſ. Color albus opacus. *Fig.* 5, 6.

*læve.* 3. B. teſta lævi tribus anfractibus, caudâ elongatâ.
Obſ. Color albus opacus; anfractus primus ſecundo multo ventricoſior; apertura ovalis. *Fig.* 7, 8.

*obtuſiſſimum.*

*obtuſiſſimum.* 4. B. teſta lævi, tribus anfractibus, apertura coarctata, cauda elongata.

Obſ. A præcedente differt et in aperturæ forma, et quod anfractus ipſi ſunt quam proxime magnitudinis æqualis. *Fig.* 9, 10.

MUREX. *Syſt. Nat.* 325.

*minutiſſimus.* M. quinque anfractibus ſpiraliter ſtriatis, coſtis remotis, canali clauſo.

Obſ. Teſta elegans pellucida.

TROCHUS. *Syſt. Nat.* 326.

*parvus.* T. teſta conica imperforata quatuor anfractibus tuberculatis.

Obſ. Color albus.

TURBO. *Syſt. Nat.* 327.

* imperforati opaci.

*nitidus.* 1. T. teſta lævi quatuor anfractibus, apertura ovali.

Obſ. Teſta obtuſa.

*ſcriptus.* 2. T. teſta lævi tribus anfractibus, lineis fuſcis characteriformibus, apertura ſubrotunda.

Obſ. Iſtæ lineæ lineis Lichenis ſcripti omnino ſimiles. *Fig.* 11, 12.

*coſtatus.* 3. T. quatuor anfractibus profundè longitudinaliter coſtatis: tranſverſim ſtriatis, apertura ovali.

Obſ. Color albus, apertura marginata, coſtæ ipſæ nitidiſſimæ. *Fig.* 13, 14.

*ſubluteus.* 4. T. quinque anfractibus longitudinaliter coſtatis, apertura rotunda marginata. *Fig.* 15, 16.

*albus.* 5. T. quinque anfractibus longitudinaliter coſtatis, apertura ſubrotunda.

Obſ. A præcedente differt, quod apertura non marginata eſt. *Fig.* 17, 18.

*reticulatus.* 6. T. quatuor anfractibus reticulatis, apertura ſubrotunda.

Obſ. Color albus. *Fig.* 19, 20.

*ruber.* 7. T. teſta lævi quinque anfractibus, apertura ſubrotunda. *Fig.* 21, 22.

* * imperforati pellucidi.

*interſtinctus.* 8. T. teſta lævi quinque anfractibus coſta tenui interſtinctis.

Obſ. Color albus, apertura ſubrotunda. *Fig.* 23, 24.

*ſtriatus.* 9. T. quinque anfractibus ſpiraliter ſtriatis, apertura ovali.

Obſ. Color albus. Teſta perelegans. *Fig.* 25, 26.

*ſubarcuatus.* 10. T. decem anfractibus longitudinaliter coſtatis, teſta ad apicem ſubarcuata.

Obſ. Color albus. *Fig.* 27, 28.

*æreus.* 11. T. ſex anfractibus longitudinaliter coſtatis, apertura ſubovali.

Obſ. Color inter coſtas æreus, coſtæ ipſæ albæ. *Fig.* 29, 30.

*elegans.* 12. T. ſex anfractibus ſpiraliter ſtriatis, coſtis remotis, apertura ovali. *Fig.* 31, 32.

*pellucidus.* 13. T. quinque anfractibus reticulatis, apertura ſubrotunda.

Obſ. Color albus. *Fig.* 33, 34.

HELIX.

HELIX. *Syst. Nat.* 328.

*tubulatus.* 1. H. tribus anfractibus longitudinaliter striatis.

Obs. Singularis hac in specie est constructio, nam testa, umbilici loco, tubo marginato qui extra testæ superficiem extenditur, instructa est. *Fig.* 35, 36.

*variegata.* 2. H. testa lævi quatuor anfractibus, primo ventricosiore, lineis rubris notatis.

Obs. Basi imperforata. Testa subpellucida, aperturæ margine patentissima.

NERITA. *Syst. Nat.* 329.

*pellucida.* 1. N. testa lævi pellucida, anfractibus tribus.

*alba.* 2. N. testa lævi subpellucida, duobus anfractibus.

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The following Marine Animal appears to constitute a new genus among the *Vermes Zoophyta.*

DERRIS.

GENER. CHAR. *Corpus* teres articulatum; *os* terminale, *tentacula* duo.

*sanguinea.* D.—TAB. 13. *f.* 1, 2.

*Observations.*

THIS singular animal is of a cylindrical form, gradually decreasing to the anus, and terminating in an acute point. It is composed of joints, and capable of the greatest flexibility: the body is composed of an external membranaceous transparent coat, that surrounds the internal parts; which are rendered visible by the pellucidness of the covering. The head is extended beyond the outer skin, and

is leſs than the anterior extremity of the body, to which it is connected by the membranaceous covering of the head forming a neck: on the top are ſituated two white cylindrical *tentacula*, capable of being elevated or depreſſed at pleaſure: the mouth conſiſts of two lips; the lower one ſtraight and fixed, the upper one hooked and moveable: when the animal is at reſt it is open, but is frequently cloſed with wonderful quickneſs, probably to ſecure the animalcula on which it may be preſumed to feed.

The internal ſtructure is compoſed of a ſimple alimentary canal, ſomewhat larger in the joints; this increaſe of ſize in thoſe particular parts originates, as I conceive, in its being attached by tranſverſe proceſſes to the external coat in the articulations, for the purpoſe of keeping this long inteſtine ſteady: a ſimilar contrivance is obſervable in the genus *Echinus*; it is capable of partial dilatation between the joints only, which is an additional proof of its being faſtened there. The animal moves by an undulatory motion of the whole body.

Though the liberality of Sir Joſeph Banks has enabled me to conſult his extenſive collection, I have not been able to meet with any author who has deſcribed a marine animal reſembling this. In this caſe it ſeemed moſt eligible to make it a diſtinct genus; to which, from the truly membranaceous ſubſtance of this ſpecies, I have given the title of *Derris*.

## EXPL. OF TAB. 13.

FIG. 1. Derris ſanguinea of the natural ſize.
2. The head magnified.
3, 4. Buccinum breve.
5, 6. Buccinum minutum.

FIG. 7, 8.

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FIG. 7, 8. Buccinum læve.
9, 10. B. obtusissimum.
11, 12. Turbo scriptus.
13, 14. Turbo costatus.
15, 16. Turbo subluteus.
17, 18. Turbo albus.
19, 20. Turbo reticulatus.
21, 22. Turbo ruber.
23, 24. Turbo interstinctus.
25, 26. Turbo striatus.
27, 28. Turbo sub-arcuatus.
29, 30. Turbo æreus.
31, 32. Turbo elegans.
33, 34. Turbo pellucidus.
35, 36. Helix tubulatus.
37, &c. See page 45.

XVI. *On the Latin Terms uſed in Natural Hiſtory. By the Rev. John Brand, A. M. A. L. S.*

*Read January* 6, 1795.

THE Latin has been adopted as the language of natural hiſtory; but the latinity of the natural hiſtorians has undergone no ſmall cenſure.

By the adoption of the Latin as the common language of the ſcience, in the degree in which it obtains, new diſcoveries in it are propagated with great facility. Other branches of philoſophy have not had the ſame good fortune; and every European nation is become philoſophical: and thus, as Monſ. D'Alembert has obſerved, he who devotes himſelf to the cultivation of any one of them, if he would keep his knowledge up to the level of its ſtate, is reduced to the neceſſity of flinging away a very valuable part of his life, in acquiring ſeven or eight languages.

But the latinity of the terms in which natural hiſtory is written, has been cenſured: upon this charge the following remarks may be made.

Such terms muſt be either primitives or derivatives; now either of theſe *may* be *barbariſms*, when not found in any good Latin author; or *improprieties* (verba impropria, *Quint.*), when, although ſo found, they are not to be found uſed in the ſame ſenſe. This muſt

muſt be admitted: but it is here contended, that it does not on this account *alone* follow that they are ſo. This is proved from the practice of the ancient grammarians in the invention of technical terms, in conjunction with the authority of Tully.

Firſt, the uſe of a Latin primitive or derivative, in a ſenſe in which it does not occur in any pure Roman writer, is not neceſſarily an impropriety, technically ſo called; for if a conſiderable variation from ſuch an eſtabliſhed ſenſe were ſo, the very grammatical terms of the Roman writers would fall under that cenſure, as for inſtance (*articulus*) an article, (*verbum*) a verb. When theſe terms were firſt uſed by grammarians, there was a great variation from their pre-eſtabliſhed ſenſe, and their primary ſignifications—a joint, a word.

It is likewiſe certain, that if grammar had not been reduced into an art among the Romans, theſe terms would not have been now found in their technical ſenſes in their writings. And if a writer of this age, having reduced the art into a ſyſtem, had preſented the world with the firſt Latin Grammar, and had given the ſame names, *verbum*, *articulus*, to the ſame things, his offence againſt pure latinity, or the pre-eſtabliſhed good uſe of thoſe words, would have been of the ſame magnitude as that of the original Latin grammarians, and no more; the ſame innovations in a language, living or dead, being of equal quality: yet the charge againſt the propriety of the terms uſed by ſuch a writer, would be the ſame in kind as that brought againſt the natural hiſtorians; but it muſt have fallen to the ground—nor would it have been in degree leſs ſtrong; for bolder extenſions in the ſenſe of Latin terms, are not, that I recollect, to be found in the Lexicon of our technical language. Theſe faſtidious grammatical exceptions are, in principle, exceptions both to the art and the philoſophy of grammar. If the naturaliſts err in this point, they err with the grammatical fathers (*cum patribus*).

Secondly, What I have to ſay about derivatives not uſed in Latin writers, will be contained in a ſhort comment on a paſſage in the Academic Queſtions of Cicero, where he aſſerts the rights and privileges of thoſe who treat on philoſophical ſubjects in a language not yet enriched with proper terms, and exemplifies his principles in the formation of a new derivative, an authority from which I apprehend no appeal will be made. The tranſlation of this paſſage is as follows. The original is placed at the end of this article *.

*Varro.* 'You will allow me the ſame liberty which has always 'been aſſumed by the Greeks, who have long purſued theſe re- 'ſearches; that *to unuſual ſubjects I may apply terms which never have 'been in uſe.*

*Atticus.* 'Certainly: but if our Latin language will not fur- 'niſh them, *you may have recourſe to the Greek.*

*Varro.* 'I am obliged to you; but I will endeavour to expreſs 'myſelf in Latin, confining myſelf to ſuch terms of Greek deriva- 'tion as are already naturalized among us, as philoſophy, rhetoric, 'phyſics, dialectics. I have therefore formed the new term *Qualitas*, 'to expreſs the ſenſe of the Greek word Ποιότης; which even among 'them is not a word of common uſe, but confined to the philoſo- 'phers. In like manner, none of the terms of the logicians are 'found in the popular language; and the ſame is true of the terms 'of almoſt all the arts: *to new things new names muſt be given, or 'thoſe of others transferred to them.* If the Greeks take this liberty, 'who have cultivated the ſciences for ages, *how much ſtronger is the 'reaſon it ſhould be granted to us, in our firſt attempt to treat upon them!*

*Cicero.* 'It ſeems to me, that you will do *a work of utility to the 'public, if you not only increaſe the ſtock of our ideas, which you have al- 'ready done, but alſo that of our words.*

*Varro.*

*Varro.* 'We ſhall therefore hazard the uſe of new words when neceſſary, and by your authority.'

And where the ſame neceſſity, ariſing from the ſame ſource, exiſts, the ſame liberty is to be taken. And as Cicero, on this point, is an unexceptionable authority, let us examine his practice, to ſee to what degree it may be carried. The word *Qualitas*, derived from *Quale*, is now familiarized to the ear. The firſt boldneſs of this derivative is only perceived by reflection; but its degree will ſtrike us more immediately, if we take the Engliſh words *what*, or *ſuch* (as), which anſwer to the Latin pronominal adjective *Quale*, and add one of the ſubſtantive terminations [hood] or [neſs] to either, to make a philoſophical term of it. I aſk the ſevere grammarians, who proteſt againſt the claſs of new derivatives in the philoſophical language of Linnæus, to produce among them a bolder example of the creation of a new term.

And by the ſame authority, we may defend his impoſing new ſignifications on old words; for in a few lines after the concluſion of the extract, there occurs a liberty of this kind, and as remarkable as the former; for Cicero there gives a new ſenſe to the pronominal adjective *Quale*, in correſpondence to that of his new derivative *Qualitas*; uſing it ſubſtantively to ſignify any being or thing, as compounded of ſubſtance and accident, or matter and qualities: "Et ita effeci quæ appellant qualia; e quibus in omni natura co-"hærente, et continuata cum omnibus ſuis partibus, effectum eſſe "mundum."

It deſerves to be remarked reſpecting theſe innovations, that this aſſertion of the legitimacy of the practice in all like caſes is here put by Cicero into the mouth of Varro, the greateſt critic and grammarian of the Auguſtan age; who wrote on the Latin language, and addreſſed his works to Cicero himſelf.

Hence it appears, that philoſophy is not reſtrained to the uſe of the common terms of any language; nor, for the ſame reaſon, to thoſe of the hiſtorians, orators, dramatic writers, poets, &c. of that language, either ſeparately or conjointly: but, as every art has terms of its own, ſo has every branch of ſcience.

That he who enriches any ſcience with a number of new diſcoveries, confers a ſecond general benefit, by enriching the language in which he treats of them, by all ſuch terms as ſhall be requiſite to do it in the beſt manner.

Cicero, repeating his new term *quality*, adds with great philoſophical pleaſantry, "Faciamus tractando uſitatius hoc verbum, et tritius." And it may be ſaid of the terms of natural hiſtory, that our elegant claſſical ſcholars will find their aſperities wear off very ſoon, if, by adding to their former acquiſitions a knowledge of this new philoſophy, they make themſelves practically verſed in the uſe of them. There may remain ſome preciſely deſcriptive, which may be yet added; ſome reformation may be wanted in thoſe which may have been haſtily adopted; and from them we may expect it.

It is to be obſerved, that theſe arguments defend the liberty, not the licentiouſneſs, of introducing new terms; and defend it upon the footing of neceſſity only; and therefore extend that liberty no further than ſuch neceſſity actually extends.

I had thought to have finiſhed here; but having made ſo much uſe of the authority of the great ornament of the Roman forum, the ſentiments of the elegant expoſitor of our own laws on this ſubject are not to be paſſed by. Theſe, with a minute change to avoid the introduction of freſh matter, are as follows: "This is a "technical language calculated for eternal duration, and eaſy to be "apprehended both in preſent and future times; and on theſe ac- "counts beſt ſuited to preſerve thoſe memorials which are intended "to

" to perpetuate [*every diſcovery in natural hiſtory*]. It is true indeed, " that many of the terms of art with which it abounds, may, as " Mr. Selden obſerves, give offence to ſome grammatical and " ſqueamiſh ſtomachs, who would rather chooſe to live in igno- " rance of things moſt uſeful and important, than to have their " delicate ears wounded by the uſe of a word unknown to Cicero, " Salluſt, or the other writers of the Auguſtan age §."

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* Cic. Op. omnia, Gronovii. Acad. Queſt. L. 1.

24. *** Dabitis enim profectò, ut in *rebus inuſitatis*, quod Græci ipſi faciunt, a quibus hæc jamdiu tractantur, *utamur verbis interdum inauditis.*

25. Nos verò, inquit Atticus. *Quin etiam Græcis licebit utare, cum voles, ſi te Latina forte deficient.* Bene ſanè facis: ſed enitar ut Latinè loquar, niſi in hujus modi verbis, ut philoſophiam, aut rhetoricam, aut phyſicam, aut dialecticam appellem, quibus, ut aliis multis, conſuetudo jam utitur pro Latinis. Qualitates igitur appellavi, quas ποιοτητας Græci vocant: quod ipſum apud Græcos non eſt vulgi verbum, ſed philoſophorum, atque id in multis. Dialecticorum vero verba nulla ſunt publica; ſuis utuntur. Et id quidem commune omnium ferè eſt artium. Aut enim nova ſunt rerum novarum facienda nomina, aut ex aliis transferenda, *quod ſi Græci faciunt, qui in iis rebus tot jam ſæcula verſantur, quanto id magis nobis concedendum eſt, qui hæc nunc primum tractare conamur?*

26. Tu verò, inquam, Varro, bene etiam meriturus mihi videris, de tuis civibus, *ſi eos non modo copia rerum auxeris ut effeciſti, ſed etiam verborum.* Audebimus ergo, inquit, novis verbis uti, te auctore. * *

§ Blackſtone's Commentaries, book iii. ch. 21.

XVII. *Additional Obſervations on the Britiſh Species of Carex. By the Rev. Samuel Goodenough, LL. D. F. R. S. Tr. L. S.*

*Read January* 6, 1795.

IT was not to be expected that, in treating on this ſubject, I could at once collect every article of information neceſſary to be mentioned, or that I could be aware of all the minute variations which take place from ſoil, from ſituation, and from climate, in ſuch a variable genus as *Carex* is. In my former paper * I endeavoured to notice as many of theſe as I could without being troubleſome from unreaſonable minuteneſs.

Some general perplexities of this ſort will preſent themſelves to all accurate obſervers,—ſuch as reſpect the length of the foliaceous *bracteæ*, which are ſcarcely in any one ſpecies abſolutely conſtant—the appearance of male flowers in the female ſpikes—the proportion of the peduncle of the female ſpikes, which in ſome ſpecies is for the moſt part ſeſſile, and yet at times is found of very conſiderable length, as happens particularly in *C. flava*,—and the diviſion of the capſules at the ſummit, which in many ſpecies are for the moſt part cloſed, and yet not unfrequently are found divided:—all theſe matters muſt be ſubmitted to the taſte and judgment of naturaliſts, who may be diſpoſed to ſtudy the ſubject with candour. I have ſtated *axillaris* as having the capſule divided at the ſummit,

* Linn. Tranſ. vol. ii. p. 126.

and *remota*, as having it entire; but this is not conſtant. I believe all *Carices* diſpoſe of their ſeeds by the opening of the point of their capſule. This opening is obſervable in ſome very early, in others not till quite old. In the former, the capſule is deſcribed as opening; in the latter, becauſe it is not ſeen but in very advanced age, it is mentioned as cloſed.

When I inſerted *C. fulva* as a diſtinct ſpecies, I did it in conſequence of a variety of ſpecimens ſent me by my friend Mr. Williams; all of which being nearly the ſame as that repreſented in the figure given in my former paper, and entirely correſponding with my foreign ſpecimens, all of the ſame growth and form, I concluded that I had nothing further to diſcover. Mr. Williams has ſince that ſent me ſpecimens of more forward growth, which prove it to be a variety of *C. flava*. In the figure of my former paper, it is repreſented with three female ſpikes; it very ſeldom has more than two. I would wiſh therefore to correct the article of *C. fulva*, and make it a variety of *C. flava*.

*C. flava*—Var. β, ſpicis fœmineis duabus.

In my former paper, p. 209, I ſpoke very indeterminately about a *Carex* given me by the late Rev. Mr. Lightfoot. All the ſpikes in thoſe ſpecimens being androgynous, I imagined them to be *axillaris*: however, my friend Mr. Pitchford of Norwich has lately ſent me ſpecimens of more complete growth, and I am now convinced that they belong to *C. extenſa*. Mr. Pitchford acquaints me, that they were found by the Rev. Mr. Bryant, near Cley, in Norfolk, in very dry ſandy ground. He tells me, that Mr. Bryant ſent ſpecimens to Mr. Lightfoot; moſt probably, therefore, thoſe which I received from him were ſent him by Mr. Bryant. I underſtood at the time, that Mr. Lightfoot had found them in Scotland; but as I had no intention of writing upon the ſubject, it is very poſſible that I was not

not ſo accurate as I ought to have been in aſcertaining its place of growth.

The ſpecimens of *C. extenſa* which I found grew in wet places, were large, and very decidedly of the order *ſpicis ſexu diſtinctis*. Thoſe ſent me by Mr. Pitchford, from their dry ſituation, are from two to nine inches high; ſome have no male ſpike at all, and ſome have the male ſpike with a few female flowers at the baſe; but the capſules and the ſquamæ retain their characteriſtic form.

I have the pleaſure of adding another hitherto unknown ſpecies to my diviſion,

*Spicis ſexu diſtinctis*: Maſculâ unicâ: bracteis foliaceis & plerumque vaginantibus.

38. CAREX PULLA. TAB. 14.

C. Digyna, vaginis nullis, ſpicis ovatis, inferiori pedunculatâ, capſulis ovatis mucronatis, mucrone bifurco.

*Habitat* in montibus Scoticis. *D. Dickſon.*

*Radix* craſſa repens. *Folia* anguſta erectiuſcula ad margines carinamque aſpera, culmo plerumque breviora, modo æquant, interdum exſuperant. *Culmus* ſuberectus circiter dodrantalis, triqueter, angulis acutis ſcabriuſculis. *Spicæ*, una maſcula, duæ fœmineæ remotæ. Spica maſcula terminalis oblonga ſemuncialis fulva, ſquamis oblongo-ovatis acutiuſculis, nervo obſoletiuſculo. Spica fœminea ſuperior ſub-ſeſſilis ſubrotunda, bracteâ brevi membranaceâ aphyllâ nigrâ, ovatâ acutâ nervo dorſali viridi; inferior ſub-ovalis pedunculata, pedunculo tenui ſpicâ ſuâ longiori. Ad baſin pedunculi, bractea foliacea, culmo brevior vix ac ne vix pedunculum amplectens, utrinque ad baſin auriculata, auriculâ parvâ ſubrotundâ. Squamæ ut in

Linn. Trans. XII. tab. 14. p. 78

C. pulla

ſpicâ maſculâ, ſed nigricantes, capſulis paulo breviores. *Capſulæ* glabræ ovatæ inflatiuſculæ compreſſiuſculæ obtuſæ mucronatæ, mucrone brevi furcato, mox nigræ. *Filamenta* ut in cæteris. *Stylus* ſtigmatibus duobus craſſiuſculis villoſis.

*Obſ.* Variat ſpicis duabus, unâ maſculâ, alterâ fœmineâ. Eſt ubi duæ ſpicæ maſculæ occurrunt. Interdum ſpica terminalis androgyna evadit.

My catalogue of the Britiſh ſpecies of *Carex* is enriched with this valuable plant through the active ſpirit of Mr. Dickſon. Its having flowers with only two ſtyles, at once unites it with *Cæſpitoſa, ſtricta & rigida*; but its lowermoſt ſpike having a long peduncle, and the capſules being mucronated, with a point bifid and ſomewhat forked, keep it diſtinct from either of them. When it has only one female ſpike, it falls in very readily with the Linnean deſcription of *C. globularis*. But that ſpecies is taller and ſlenderer, and beſides has rough villous capſules—this perfectly ſmooth; a mark of the moſt deciſive diſcrimination.

The ſpecimens of various new plants, and eſpecially of cryptogamous ones diſcovered in Scotland, either by Mr. Dickſon perſonally, or by perſons incited by him, give us well-grounded hopes, that the preſent laudable ſpirit of reſearch in that country will in its progreſs bring ſtill new ſubjects to light; a circumſtance at all times redounding to the honour of any country and any diſcoverer.

My friend Mr. Davies has informed me, that *Carex filiformis* is to be met with in the Iſle of Angleſea, in the pariſh of Landegfan, on a ſwampy ſpot, lying S. W. of Park Pool.

*C. muricata*, var. *β*, which perhaps is not a common plant, grows near Eaton, in Shropſhire, in the banks of the drieſt ditches, as I am informed by my friend Mr. Williams. So ſingular a habitation deſerves notice. Var. *α* always prefers moiſt meadows.

XVIII. *A Deſcription of the Porbeagle Shark, the Squalus Cornubicus of Gmelin, Var.* α. *By the Rev. Samuel Goodenough, LL.D. F.R.S. Tr. L. S.*

*Read February* 3, 1795.

MR. Pennant, whoſe zoological labours will ever be conſidered as a prime ornament to the ſcience of Natural Hiſtory as well as his native country, profeſſes to have had no opportunity of ſeeing this ſpecies of *Squalus*. We lament that ſuch copious and elaborate works ſhould ever be defective in any reſpect; yet, whoever has turned his thoughts to ſuch compoſitions, muſt be ſenſible that deficiencies are unavoidable. To complain of ſuch omiſſions marks the Pſeudo-naturaliſt. Inſtead of noting what has not been done, the grateful mind of a true naturaliſt receives with thankfulneſs what is collected for his information; he is anxious to ſupply little defects, and feels a laudable pride in making uſe of the opportunity. I am induced from motives of this kind, to lay before our ſociety the deſcription of the *Porbeagle Shark*.

During my ſtay at Haſtings in the month of September 1793, the fiſhermen brought this animal to ſhore. My friend the Rev. Mr. Whitear (to the ingenuity of whoſe ſon, Mr. William Whitear, I am indebted for the drawing of its figure, which is executed with great exactneſs), happening to be at the ſea-ſide at the time, ſecured it

it for my inſpection. It had been landed about four hours when I firſt ſaw it. It weighed twenty-ſix pounds.

The length of the body, from the tip of the noſe to the extremity of the tail, was three feet ten inches. The colour of the body was a deep blue on the back, and white or ſilvery underneath. The ſhape was round, except for about ſix inches from the tail, where it was depreſſed. At about one inch from the tail was a ſemicircular or lunar foſſule or impreſſion, the points towards the tail. Where the body was depreſſed, the ſides were raiſed into a ſharp angle or elevated line. This line was about eight inches long, and ran out into the middle of the tail, or ſomething more.

The noſe was projecting and ſharp. On either ſide from the noſe to the eyes, were numerous minute perforations or pores. The eyes were placed four inches from the point of the noſe, and were upon an exact level with the ſurface of the body. They were an inch in diameter, the pupil black, the irides white. Five inches and a half behind the eyes were five gills (*ſpiracula*) placed in a regular ſeries; the apertures were perpendicular, and about three inches long: they occupied a ſpace of nearly three inches and a half.

Immediately behind the gills were the pectoral fins, which were eight inches long, and behind of a ſemilunar form. Six inches behind the pectoral fins, the ventral were placed; they were three inches three quarters long, and behind alſo ſemilunar. Between the ventral fins was a longitudinal aperture nearly three inches long. *Intra fiſſuram utrinque mammilla brevis carnoſa ſ. cartilaginea.* Four inches behind the ventral fins the anal appeared, one inch ſeven eighths long. It was placed vertically, behind ſemilunar. The baſe of the tail was four inches from the anal fin. The tail was of a lunar form, vertical, the upper lobe nearly one third longer than the lower.

Of the dorſal fins, the firſt was fifteen inches and three quarters from the point of the noſe; it ſtood erect, four inches and a half high, and five and a half long. The ſecond was twelve inches behind this, of the ſame length and ſize as the anal, to which it ſtood nearly oppoſite.

The ſkin, when ſtroked backwards, was a little roughiſh, and an obſolete line of minute tubercles ran from the head down the ſides, and at length ended in the thick elevated ridge, which took place at the depreſſion of the body near the tail.

We have been hitherto ſpeaking of the fins and the upper ſide of the body.

On the under ſide, from the point of the noſe to the noſtrils, were numerous minute pores or perforations. The noſtrils were three inches from the point of the noſe, of a lunar form, the extremities pointing towards the tail. At an inch and one eighth from the noſtrils, was the higheſt part of the curvature of the mouth. The mouth was ſemicircular, about five inches wide. The upper jaw had two rows of teeth, except in the front, where the two middle ones ſtood ſingle. The under jaw had two rows alſo, except in the front, where the two middle teeth had a triple row. The inward row was bent inwards, the others all turned outward. The teeth were white, very ſharp, ſmooth, two-edged, with a little acute proceſs at the baſe on either ſide. This proceſs in many lay concealed within the gums. The tongue was white, very ſhort and cartilagineous.

All the fins were blueiſh before and whitiſh behind; they were alſo all of a firm texture, very ſtrong, cartilagineous, and to all appearance, for I did not diſſect them, without bone or nerve.

The genus of *Squalus* is not well known, owing to the very imperfect deſcriptions which we have of them; this has induced me

me to be ſo very particular in my account of this ſpecies. If I am wrong in ſuppoſing it the *Porbeagle* of Mr. Pennant, I can anſwer for the exactneſs of the deſcription. It cannot be the *Beaumaris Shark*, becauſe Mr. Davies (upon whoſe conſummate accuracy any one may implicitly rely) deſcribes it with a blunt noſe; this has a ſharp one. Upon what authority Gmelin joins the Porbeagle and Beaumaris ſharks as one ſpecies, I do not pretend to know. Perhaps it would be adviſable that thoſe who have opportunities ſhould examine them very minutely. Gmelin deſcribes it as having a fold or plait (*plica*) on each ſide of the tail. In the preſent ſpecies there was a ſtrong elevated line or ridge, but nothing of a plait.

From the rows of the teeth, the fiſhermen who caught it judged it to be two years old. My friend Mr. Whitear told me, that he has ſeen them eight feet long, with a triple row of teeth.

There was nothing in the ſtomach.

The eſſential character of this ſpecies may be expreſſed as follows:

*S. corpore tereti antice acuto caudam verſus depreſſo et utrinque angulato.*

Tab. 15 repreſents an outline of the *Squalus Cornubicus*, one fourth of its natural ſize.

XIX. *Obſervations on the Britiſh Fuci, with particular Deſcriptions of each Species. By the Rev. Samuel Goodenough, LL. D. F. R. S. Tr. L. S. and Thomas Jenkinſon Woodward, Eſq. LL. B. F. L. S.*

*Read April* 7, 1795.

GMELIN, profeſſor of botany in the Imperial Academy at Peterſburg, and nephew to the celebrated author of *Flora Sibirica*, was the firſt who wrote profeſſedly upon the hiſtory of *Fuci*. His work appeared in 1768. It will ever bear teſtimony to his zeal for the cauſe of natural hiſtory, and to his abilities. In his moſt elaborate *Hiſtoria generalis* he has mentioned almoſt every ſcientific remark that had been made before his time. We have, in due order, his deſcriptions of the root, the fructification, his *negative* generic character, the theory of the immortal Reaumur, with his remarks upon the inſufficiency of it. Nor does he paſs over unnoticed the philoſophical diſquiſitions on the cauſe and origin of plants, and their variation in growth; every where adding his own accounts of what he has actually obſerved. If he errs any where in his ideas, ſtill his obſervations, being all practical, are truly valuable. Naturaliſts cannot keep too cloſely in mind the value of actual obſervation and accurate record; for all memorabilia of this kind being once ſet forth, remain, let ſyſtems vary as they may, inſtructive to the end of time. The natural figures of a Brunsfelſius will illuſtrate their

their ſubjects in all ages, and an Ariſtotle's deſcription of the *Chamæleon* will delineate this curious animal to the moſt diſtant period.

Gmelin's general hiſtory is cloſed with chemical accounts, and experiments made upon ſeveral of the *Fuci.* None of theſe matters need be retailed by us; we only mention the ſubjects treated of, and poſſibly may refer to ſome few of them as we proceed. Our more immediate buſineſs is with his method of arrangement; for perhaps it would add ſomething to the knowledge of a ſubject, were each ſucceeding ſyſtematiſt to give his reaſons, why he accedes to ſyſtems eſtabliſhed before him, or why he leaves them.

It is impoſſible to follow Gmelin in his arrangement of eith erthe genera of which he treats, or the orders under which he claſſes them. In the firſt place, becauſe there is, as muſt be confeſſed, great and almoſt total ignorance of the fructification of ſubmarine plants, he diſcards all idea of taking any generic character from that intereſting circumſtance. We think however, and hope when we treat upon that point that we ſhall ſhew, that there is ſufficiently *apparent* difference of character in the fructification to accompliſh all that we want, viz. generic characters for *Fucus*, *Ulva*, and *Conferva.*

In conſequence of rejecting all idea of fructification for his generic character, Gmelin has fallen into the greateſt miſtakes; the Linnæan genera, *Fucus*, *Ulva*, and *Tremella* are all denominated *Fuci*; and had he had time to have completed his deſign, he would have added to this group *Byſſus* and *Conferva.*

He does not appear to us to be more happy in his diſpoſition of the diviſions of his genus. To conſtitute theſe, he is perpetually reſorting to the fructification. In many inſtances he does not attempt any modification of character, but actually gives as it were new generic characters to his diviſions. In his diviſion *membranacei*, he ſays,

ſays, *Fructificatio, Proles frondium deciduæ* *. In his diviſion *penicilliferi*, of which *Gaërtnera*, Mr. Hudſon's *pedunculatus* as we ſuppoſe, ſtands as the pattern and authority, he makes the growth of a little green *Conferva* upon the tubercles to be the deſcription of the diviſion: we have ſeen ſpecimens quite free from it. Obſervations of the ſame ſort might be made upon the others; but one thing alone precludes all acceptation of his method; which is, that he admits plants into theſe very nice diſcriminations of diviſion eſtabliſhed by the fructification, of whoſe fructification he profeſſes himſelf entirely ignorant. Laſtly, he has not given any ſpecific characters; which makes the inveſtigation extremely laborious.

His deſcriptions in general are very faithfully attended to, but his ſynonyms are ſeldom to be depended upon. He was not aſſured even of the Linnæan ſpecies, as may be proved, among many other inſtances, from his miſtaking *F. ceramoides*. It is a work however of great merit, and abſolutely neceſſary to every one who would wiſh to ſtudy the ſubject. We truſt our marking theſe de-

* Gmelin, obſerving in ſome of our plants of the diviſion *Fronde planâ aveniâ*, a proliferous tendency, and taking it for granted, that thoſe plants produced no ſeeds becauſe he had obſerved none, but that the ſole mode of propagation conſiſted in theſe rudiments of plants falling off, attaching themſelves to other bodies, and thus becoming new plants, becauſe he had ſeen a probability of this proceſs in ſome; at once raſhly adopted Adanſon's unphiloſophical idea, that ſome plants were uniſexual, that is, produced flowers of one ſex (female) only (ſuch are all the *Fuci* which bear tubercles); and that the others were aſexual, that is, were merely proliferous, and had no flowers at all of either ſex:—ideas and terms, though followed by the great names of Gmelin and Gaërtner, yet in our judgment quite unworthy of any thing that deſerves the name of philoſophy.

Since writing our preface, we have ſeen Major Velley's elegant and ingenious publication on marine plants; where, among a variety of curious obſervations, he very properly expoſes the futility of Gaërtner's remarks upon the fructification of *Conferva*; an idea which we hope to be able to purſue when we treat of that genus.

fects will not be imputed to any promptitude in us to find fault, but to a deſire to ſave the trouble, and prevent the errors, of the young botaniſt, who might otherwiſe be miſled by placing too implicit a confidence in an author of ſo highly eſtabliſhed a reputation.

We need not dwell long upon the labours of the older botaniſts. Moriſon, in *Hiſt. Oxon.* v. iii. p. 644, gives a very elegant account of his ideas of the manner in which the ſeveral plants are propagated. But there are very few deſcriptions added to his nomenclature: whence we are often obliged to have recourſe to his ſynonyms to aſcertain his meaning; a circumſtance at all times, unleſs a figure accompany it, extremely precarious. He gives no generic character, and his orders are quite void of preciſe determination. He has collected a great many ſpecies, and his figures are in general very expreſſive.

Nothing can well be more vague than Mr. Ray's generic character of *Fucus*. It would apply in ſome meaſure to any thing or every thing ſubmarine. He very often gives very ſtriking deſcriptions—but his laſt diviſion, *Foliis vel leviter compreſſis vel teretibus*, is too looſely given. It muſt nevertheleſs be allowed, that his diviſions are the moſt ſatisfactory except thoſe of Mr. Hudſon.

Linnæus, in his *Sp. Pl.* publiſhed at Vienna 1764, arranged the *Fuci* under the following diviſions:

1. *Dichotomi* { *frondeſcentes* / *cauleſcentes*
2. *Ramoſi* { *foliis diſtinctis* / *fronde unitâ*
3. *Fructificationibus non veſicariis.*

There cannot be a more faulty paſſage pointed out in the whole circle

circle of that great man's writings: this is the more ſurpriſing, as, almoſt in every particle, of arrangement and ſyſtem, he ſhines among his competitors

'——— *velut inter ignes*
*Luna minores.*'

Such an impoveriſhed arrangement probably prevented Profeſſor Murray and other editors of his works from attempting any.

Nothing can be more confuſed than Mr. Lightfoot's method—No order is obſerved. He ſeems to have deſcribed his plants almoſt as they ſeverally came to hand. All his deſcriptions and figures are excellent; but a regard to truth obliges us to remark, that in many of his deſcriptions he has borrowed very freely from Gmelin, and that without any acknowledgment whatſoever.

To the praiſe of the late Mr. Hudſon be it mentioned, that he was the firſt who ſtruck out a true *lucidus ordo.* All his diviſions are taken from one and the ſame ſource, viz. the different habit and formation of the frond. We have no doubt but that all the *Fuci* of the known world might be claſſed after his method—a method capable of the moſt extenſive amplification. It is needleſs to repeat it here, as it is in every body's hands. If we make any alteration in his diſpoſition, it will be little more than to change the words of his diviſion *fronde unitâ* into *foliis unitis*, a more intelligible term; and to introduce a new diviſion in perfect conſonance with the neatneſs of his arrangement—namely, *Fronde hinc canaliculatâ:* for ſome of the plants which we ſhall place under this diviſion but ill accord with the character *Fronde planâ aveniâ*, under which they were before arranged. It would have ſhortened our labour extremely, could we have followed Mr. Hudſon in his eſſential characters; but ſo much new light has been thrown upon the ſub-

ject in conſequence of Dr. Smith's moſt fortunate purchaſe of the Linnæan Muſeum, then ſo many errors in the nomenclature have been diſcovered, ſuch miſconceptions of Linnæus's deſignation, and ſo many new ſpecies found ſince Mr. Hudſon wrote, that it was in our judgment better to begin *de novo*, and to lay the whole before our Society, drawn up afreſh, and containing complete deſcriptions taken from the plants themſelves.

The fructification of the *Algæ*, particularly of thoſe called *aquaticæ*, is the *opprobrium botanicorum*, and indeed ſeems likely to continue ſo. It may be aſked, what advance has been made in the knowledge of this particular tribe by any modern?—Moriſon's obſervation furniſhed him with almoſt as much knowledge of the ſubject as is likely to be obtained, till a Hedwig ſhall undertake to illuſtrate theſe plants alſo. Moriſon's words are, 'If any one aſ-'ſerts that the *Algæ* are produced from ſeed, or ſomething analo-'gous to it, I do not contradict him; for in ſome plants there 'ſeems ſomething thick and tuberoſe, adhering to the leaves them-'ſelves; in others there appear ſmall veſſels diſtinct from the leaves 'and the other parts, which however do not contain ſeeds dry and 'hardened like thoſe of land plants: but it is probable that a viſ-'cous and viſcid humour (if it be merely a humour) is produced in 'them endued with a ſeminal power, which dropping out of its 'own accord, or waſhed out by the agitation of the ſea, is carried 'here and there, and is diſſeminated; and then by virtue of its 'mucilage ſticks to rocks, ſtones, ſhells, and calcareous ſubſtances 'with which it may meet, and, having found a proper receptacle, un-'folds the image of the future plant.' Perhaps glaſſes were not ſo much uſed in Moriſon's time as at preſent, otherwiſe he would have obſerved ſeeds in thoſe thick and tuberoſe parts which he mentions. Gmelin and Reaumur, who hazarded the moſt decided

opinion concerning the fructification of certain of the *Fuci*, entertained ideas of the generation of theſe plants nearly correſponding with thoſe of Moriſon: but, aided by the better aſſiſtance of good glaſſes, they more accurately obſerved the tubercles; and Reaumur diſſected theſe tubercles, and found them to be capſules replete with minute ſeeds.

Reaumur was the author who firſt aſſerted that the *Algæ*, or at leaſt a part of them, were moncœcious; for, obſerving the ſurface of ſome of theſe plants very minutely, he remarked, in the *Fucus ſerratus* more particularly, and in a few others, little cluſters of filaments, extremely tender and ſhort, in the little dots which are apparent on each ſide of the nerve which runs through all the branches. Unable to account for ſuch an appearance, and wiſhing to eſtabliſh his favourite hypotheſis, at the expence of numberleſs perplexities and contradictions, to which he could oppoſe little better than ſurmiſes and imaginations, he pronounced them to be male flowers. Gmelin very properly takes up the argument againſt him; and ſhewing how very few plants exhibited theſe filaments, and then arguing from their total defect of *antheræ* (abſolutely neceſſary were analogy to be reſorted to), and their diſtance in all, except in *Fucus elongatus* (our *loreus*), from the female flowers (though it muſt be allowed that this argument is very far from a good one), he ridicules the whole idea—at the ſame time ſuggeſting another full as improbable, if not more ſo, that theſe minute threads are organs of nutrition. All theſe ideas muſt, however, be left to the development of future naturaliſts. The advantage to be derived from Reaumur (for we would preclude no future inveſtigation even on the ſame ground) is, that he deſcribed exactly what he ſaw, and delineated the parts of which he ſpoke, with conſummate accuracy. We have the fact ſtated exactly; the argument to be drawn from it,

depends

depends upon the judgments of the various botaniſts who ſhall read and ſtudy his obſervations. See his plate of F. *ferratus* in *Act. Pariſ.* 1772, part 2d, pl. 3, f. 5 and 9.

Cryptogamic inveſtigation was not Linnæus's excellence—the truth of this appears no where more than in the *Algæ aquaticæ*. In the ſynoptic table of *Syſt. Naturæ* at the head of his claſs *Cryptogamia* he deſcribes them—

| | | |
|---|---|---|
| *Tremella* | — | *A. gelatinoſa* |
| *Ulva* | — | *A. membranacea* |
| *Fucus* | — | *A. coriacea* |
| *Conferva* | — | *A. capillaris.* |

In the body of the work they are deſcribed from the fructification—

*Tremella* — *Fructificationes vix manifeſtæ in corpore gelatinoſo.*
*Ulva* — *Fructificationes in membranâ diaphanâ.*
*Fucus* — *Maſc. Veſiculæ villis intertextæ.*
*Fœm. Veſiculæ adſperſæ granis immerſis apice prominulis. Semina ſolitaria.*
*Conferva* — *Tubercula inæqualia in fibris capillaribus longiſſimis.*

The diſcrimination in the ſynoptic table need not engage our attention one moment; it does not hold true, neither has it any thing to do with the ſexual ſyſtem, by which all ought, and, it ſhould be apprehended, may be determined, at leaſt to a certain degree.

In reſpect to the deſcriptions of the fructification in the body of the work, we muſt object to the character of *Fucus* for the ſame reaſon that Gmelin does to Reaumur's male flowers. They have no appearance of *antheræ*, and the *villi* appear evidently to be nothing more than

the conſequence of the internal laceration of the ſubſtance, as the part becomes dilated into the veſicle, which is, generally ſpeaking, the mere organ of buoyancy, very rarely of fructification. We have ſeen theſe threads of different forms, ſize and texture, in proportion to the enlargement of the veſicle. If analogy muſt be reſorted to, theſe threads ought rather to be conſidered as *nectaria* than any thing elſe belonging to the fructification: but, in fact, the whole idea is ſo vague and inconcluſive, that nothing but the name of the illuſtrious author could have ſupported it for a moment; and even were it confirmed, there are very few ſpecies which could be made at all to agree with the deſcription.

We ſhould object to the character of *Ulva* for two reaſons—Firſt, he ſays *fructificationes*, without naming what ſort; and then, becauſe he adds, *in membranâ diaphanâ*; according to which, all the *Fuci* of the diviſion *fronde planâ aveniâ* muſt be denominated *Ulvæ*.

We muſt object to *Conferva*, becauſe, from his term *tubercula inæqualia in fronde capillari*, all the *Fuci* with capillary branches muſt be included, particularly *F. purpuraſcens*, to name no more. Add to this, that on the *Confervæ* of the firſt and ſecond diviſion, as well as on ſeveral of the geniculated ones, no tubercles have ever yet been obſerved. They conſequently do not at all agree with the character; nor are the ſimple-threaded *Confervæ* in any way diſtinguiſhed from the filamentoſe *Byſſi*, except by the totally inadmiſſible deſcription, *fibris longiſſimis*.

The genus *Tremella* we ſhall paſs by, as not connected with our preſent plan. Linnæus, forming the eſſential characters partly from external habit, and partly from fructification, conſidered thoſe *Algæ* which were gelatinous as *Tremellæ*, and thoſe which were membranaceous as *Ulvæ*. But as the eſſential characters which we ſhall propoſe are taken from the fructification ſolely, ſuch gelati-

nous *Algæ* as have innate fructification diſperſed throughout the *frons*, muſt neceſſarily be arranged in the genus *Ulva*; which will conſequently include, if not all the aquatic, in great probability all the marine *Tremellæ*.

We muſt again call upon the candour of the Society not to impute theſe corrections of our great maſter Linnæus to any ſiniſter views.—We ſee errors, we ſtate them.

It is with the utmoſt diffidence, that, after having ſaid ſo much, we preſume to ſuggeſt any other deſcriptions in the room of thoſe which we have rejected; but as it is abſolutely neceſſary that ſome ſhould be propoſed, we would beg leave, from the very imperfect light by which we at preſent walk, to define the characters as follows:

*Fucus* — *Semina, tuberculis confertis apice dehiſcentibus, innata.*
*Conferva* — *Semina, tuberculis rotundis ſolitariis clauſis fronde extantibus, adnatis, incluſa.*
*Ulva* — *Semina ſimpliciſſima frondi innata, undique ſparſa.*

In ſtating theſe ideas of character we are thoroughly conſcious of our imbecility and ignorance. We profeſs only to eſtabliſh certain data from the appearance of what may be juſtly deemed fructification, and conſtitute our differences accordingly.

Before we diſmiſs this ſubject it may be proper to obſerve, that in many *Fuci* two ſorts of fructification are to be ſeen—one warty tubercles, and the other numerous ſingle grains. The obſervation of theſe has again led ſtudents to imagine that they are the differences of ſex. Undoubtedly both theſe appearances are of the female flower, *i. e.* ſeminal—We have obſerved them occaſionally in F. *alatus*, *vermicularis*, and *hypogloſſon*, ſcattered along the rib or nerve, or on the membrane on each ſide of it. Some few of theſe grains

grains we have obſerved ſwelling apparently into a tubercle, and the others diſappearing. Whether this be the mode of perfecting the fructification, and that ſuch of theſe grains as are impregnated ſwell into ſeminiferous tubercles, whilſt the reſt are abortive and decay—or, whether theſe grains may not be real ſeeds eſcaped from a tubercle, the coats of which are burſt, and adhering to the frond, it were to be wiſhed that naturaliſts reſident on the ſea-ſide would examine and endeavour to determine.

The tubercles of the greater part of the *Fuci* open at the point, are imbedded in the ſubſtance and become ſwollen as in *Serratus*, *Spiralis*, &c.—or aſſume a broad warty form as in *Laceratus* and ſome others of the diviſion *Fronde planâ aveniâ*—are imbedded, ſmooth, and veſiculiform, as in *Criſpus*, &c.—project very much from the *frons*, as in *Confervoides*—or are ſituated in a pedunculated capſular proceſs, as in *Siliquoſus*, *Pedunculatus*, &c.—But practice will make theſe and all other matters relating to the inveſtigation, very eaſy to any ſtudent who has a real ardour for natural hiſtory.

It has been the general opinion of naturaliſts, that the root of *Fuci* is an organ of adheſion only, and not of nutrition. It ſeems ſo admirably calculated for the former of theſe purpoſes, that probably this idea has precluded all conſideration of the latter. How the vegetation is carried on, cannot be preciſely aſcertained; and although it does not ſeem likely, that the root ſhould draw nouriſhment from the rock, ſtone, or other body to which it is affixed, in the ſame manner as the roots of terreſtrial plants from the earth in which they grow; yet it would be difficult to aſſert and bring proofs, that while it fixes, it does not alſo aſſiſt to nouriſh.—They are principles by no means incompatible. It is very poſſible, that the element in which theſe plants grow, may be imbibed at numberleſs minute pores on the ſurface of the frons, imperceptible

imperceptible to our ſight, and that theſe pores may be common to the root with the reſt of the plant, and thus the divine will may be accompliſhed.

All *Fuci* appear to proceed from a thin, round, entire or fiſſile, glutinous, coriaceous ſubſtance—This will appear to any one who will watch the growth of *F. loreus*. In ſome few this ſubſtance is fiſſile, and imitates the fibres of land plants: but each fibre attaches itſelf by its extremity, which immediately becomes a flat diſk, to ſome rock, and, if the rock be ſmooth, longitudinally alſo. This mode of growth contributes greatly to ſtrengthen Moriſon's opinion before mentioned—not that he thinks nouriſhment is performed by this adheſion, for his words immediately following thoſe before quoted are—'But the plant, being formed from it, takes aliment to itſelf by 'means of little fibres (*fibrillæ*, i. e. branches) being put forth, by 'which aliment being continually nouriſhed, it acquires its juſt 'magnitude; and there can ſcarcely be a doubt but that, together 'with its complete age and growth, it muſt receive a power of gene-'rating another plant ſimilar to itſelf. For ſince little tender *Fuci*, 'and as it were newly budding forth, are caſt up upon the ſhore, 'which are faſtened to ſhells and little ſtones, and at the ebb of the 'tide ſimilar ones are to be ſeen affixed to hard rocks; it is far 'more likely that they are produced by this means, than that they 'ſhould ſpring up out of thoſe more ſolid bodies to which they 'adhere.'

Gmelin's idea of the root does not in this one inſtance accord with fact. He ſays, that thoſe of our diviſion *Fronde planâ aveniâ*, which are thin and papyraceous, have never ſhewn any appearance of root. Never was there a more palpable miſtake. The root in all of them is a flat dilated diſk, more or leſs in proportion to the ſize and ſubſtance of the plant. One of our thinneſt and moſt tender

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productions, F. *laceratus* var. *laciniatus*, has not only this kind of root, but ſometimes for the ſpace of two or three lines, has a roundiſh ſtalk before it is diſſolved into its thin laminæ or branches.

The root is either purely fibrous as in *Saccharinus*, or between ſolid and fibrous as in *Serratus*, where a tendency to fibrous diviſion is obſervable; but the fibres, which are ſomewhat prominent upon the ſurface, are webbed as it were, or connected by a thick membrane or the intervening part of the diſk: or laſtly, which is by far the moſt numerous, an entire ſolid diſk. There are different modifications of this laſt ſort of root. Sometimes, as in *Siliquoſus*, it becomes in its more advanced age a ſolid woody cone—ſometimes a plant having ſprung from this diſk, conſtantly throws out from its very baſe cluſters of little ſurculi, which accidentally touching the rock form a callus, by which as by a new diſk it adheres, and thence becomes the parent of a new plant. Its original, from a ſmall diſk, is thus ſo covered over and obſcured, that it is not to be diſcerned. This takes place particularly in F. *purpuraſcens*, which hence is generally deſcribed with a fibrous root. From this ſurculoſity at the baſe, and the ſurculi occaſionally forming new diſks and new plants, ſome *Fuci* appear to have creeping roots. Mr. Lightfoot deſcribes his F. *repens, frondibus cæſpitoſis repentibus*. The *Fuci* in the diviſion *Fronde planâ aveniâ*, when they attach themſelves (as is no uncommon caſe) to other *Fuci*, envelop the whole branch, the thin papyraceous branches adhering whereſoever they touch.

The F. *natans* is deſcribed by Linnæus, *libere natans nec radicatus*. Theſe words muſt be underſtood to mean *floating at large, and not faſtened by any root*. He never could mean, *having no root;* for his own ſpecimen in the herbarium has one, which is a *diſcus explanatus*, and appears to have a very ſlight power of adheſion. It may be preſumed that it is an inhabitant of the deep waters, beyond the reach

reach of human ſight. Storms and tempeſts, diſlodging it from its native bed, bear it in their uncontrollable violence to all the ſhores of the known world.

F. *bulboſus* is a plant *ſui generis*—the diſk immediately aſſumes an inflated bulbous form—the bulb becomes covered with numerous excreſcences, which require very minute inveſtigation. The aſcertainment of its œconomy in this particular, as alſo of its fructification, would be a ſubject of very curious enquiry.

All plants produced from thoſe rudiments of new branches obſervable on the ſurface of *mammilloſus*, *rubens*, &c. muſt neceſſarily have a plain diſcoid root, that being the cauſe of their firſt adheſion.

After all the pains we have taken to make our deſcriptions complete, we are aware that many ſpecimens will be found apparently much at variance with what we have aſſerted. This ariſes from two cauſes—from the mutilations which they ſuffer from the violence of the waves, or other injuries, and their growing nearer or more remote from the deflux of freſh water.

A very frequent effect of injury is the proliferous or reproductive tendency which is thereby occaſioned, and which often ſo alters the natural appearance of the plant, as to entirely diſguiſe it to the eye of an unpractiſed obſerver. This is extremely frequent in F. *ſinuoſus* (*rubens* Fl. Ang.) when the membranous parts are deſtroyed, and only the nerves or fibres remain, from which young leaves are frequently ſeen to ſhoot in great abundance, giving it an appearance ſo entirely different from that which it at firſt had, that it might eaſily be ſuppoſed a different ſpecies, did not the frequency of this plant afford us an opportunity of ſeeing it in all its varying forms. The F. *rubens* (*proliſer* of Lightfoot, *criſpus* Fl. Ang.) perhaps owes ſome of its appearance to this cauſe; for the young

plants are at firſt entire, and thoſe of a more advanced growth ſhew ſometimes much leſs appearance of this proliferous tendency than others: but we cannot, in this ſpecies, attribute the whole of the particular habit to theſe accidental cauſes. The callous rings ſo frequently ſeen in *faſtigiatus*, we ſuppoſe alſo to be principally occaſioned by injury, as we have largely explained in treating of that ſpecies.

Injuries done to the coarſer ſorts may be more readily traced in their effects—F. *inflatus* is one inſtance of this, which is probably nothing more than *veſiculoſus*, with a branch inflated or ſwollen by the injury of ſome inſect or outward violence. The *veſiculoſus* var. *foliaceus*, affords one of the moſt remarkable inſtances of reproduction occaſioned by external violence. This has been firſt noticed by Major Velley in Withering's Bot. Arr. vol. iii. p. 241; and as the paſſage is but ſhort, we ſhall be excuſed for quoting it entire. 'If the F. *veſiculoſus* receives an injury or fracture in any part of 'the leaf, provided it be in a healthy vegetating ſtate, it conſtantly 'throws out abundance of young leaves from the injured part. If 'even a ſmall aperture be made in the middle of it, a new leaf on 'either ſide will be found to ſhoot out.' Without this explanation it would appear extraordinary, that, where a branch is broken off, not only a cluſter of new leaves ſhould ſhoot from the fractured end, but that alſo numerous ſimilar ones ſhould be produced from the ſides of the broken branch; which we have obſerved to take place. This will alſo account for the frequent appearance of theſe new leaves on the ſurface of the root itſelf, even whilſt the plant is apparently in a perfectly uninjured ſtate.

The ſoil, or their growing near freſh water, or altogether diſtant from it, makes a great difference in the ſize and texture of any plants. On the more inland banks of the Severn, and in the extenſive æſtuary in the north of Lancaſhire, formed by the influx of

the Ken, Leven, and other ſtreams, F. *canaliculatus* is ſometimes found remarkably luxuriant. At Ilfracombe, where there is a very trifling influx of freſh water, F. *faſtigiatus* grows ſo ſlender and compact, that no inexperienced perſon would think it the ſame as the large *interceptus*. We ſuppoſe theſe things principally occaſioned by the vicinity or abſence of freſh ſtreams. At Ilfracombe F. *fibroſus* grows ſcarcely more than a foot high; but we have ſeen it thrown up on the ſhore at Weymouth after a violent ſtorm, literally appearing to us at firſt ſight to be the root of ſome great tree. The different appearances of *multifidus* are occaſioned by differences of ſoil, ſituation, or growth—as are thoſe of *nodoſus* alſo. We mention all theſe things chiefly with a view to appriſe young ſtudents, that when we have given deſcriptions of the height, texture, ſubſtance, &c. yet ſtill it is very poſſible that plants may be found differing conſiderably from our accounts.—All we wiſh to do is, to ſtate the general appearance: we cannot be accountable for the irregularities which proceed from ſo many cauſes as are to be found in all the variations of growth, ſoil and climate.

Some little mention ought to be made of the colour and opacity of *Fuci*. In all our deſcriptions we have endeavoured to note the natural colour: but if plants have lain long in the water, and been left by the reflux of the tide on the ſhore, where they are neceſſarily expoſed to the power of the wind and ſun, the proper colour is oftentimes all diſcharged—they become white or black, &c. according to circumſtances. In drying *Fuci*, green and red colours retain their proper appearance, but the olivaceous colours uſually appear black. Where the change has been effected by drying only, the original colour may generally be detected by holding up the plant to a ſtrong light of a candle or lamp.

*Fuci* are alſo more or leſs opake from a variety of cauſes. Our variety of *faſtigiatus* called *interceptus* is in general opake: but the new branches produced beyond the rings at the extremity of the frons, that is after injury received, are green and ſomewhat pellucid; for in almoſt all plants the parts repaired are of a ſubſtance and texture weaker and ſofter than the ſound parts. The F. *palmatus* is a remarkable inſtance of the difference of opacity—ſome ſpecimens being thin as paper and pellucid, and others of a perfectly horny or leathery ſubſtance when dried. There are a few *Fuci*, which may perhaps hereafter be diſcovered to belong to the genus *Ulva*. We ſhall only mention *ligulatus* as an inſtance: but as this ſtands arranged among the *Fuci* by Mr. Lightfoot and Mr. Hudſon, we leave it there, having no authority from any appearance of fructification to diſplace it. All *Fuci* are more or leſs pellucid and thin in their firſt beginnings. We have ſpoken of their ſubſtance as it is more generally obſerved in properly grown plants.

The ſtructure of the *Fuci* is ſo very ſingular, that were they not affixed by their baſe to the rocks, as terreſtrial plants are by their roots to the ground, we ſhould be at a loſs how to trace any kind of analogy between them—and yet it has been a favourite employment with all writers; and it countenanced Reaumur in his hypotheſis of *Fuci* being provided with male and female flowers.

They are formed without leaves *, of one continued ſubſtance, of various texture, from the moſt tender and membranaceous to the moſt

* It may be objected, that we have ſaid the *Fuci* are formed without leaves, and yet we take our two firſt diviſions, *foliis diſtinctis* and *foliis unitis*, from that circumſtance. It is not that the plants of thoſe diviſions really have leaves; but only the appearance of them; and we adapt this appearance to the general language of the Linnæan ſyſtem. The plants arranged under both theſe diviſions do not make up a fifth part of the whole. By the

moſt firm and thick—numerous beyond deſcription, capable of being turned to the uſe of man in many ways, both as to food and other conveniences, and affording protection and ſupport to myriads of the ſubmarine inhabitants—All this marks the goodneſs of the ever bleſſed Godhead, 'by whom they are and were created.'—That part in creation is not to be found, where ſome principle does not invariably act beneficial to man.

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N. B. As we have referred to ſeveral of the old *Herbaria* preſerved in the Britiſh Muſeum, it is proper to mention that they are as follow:

*Buddle*, Plantæ Britannicæ, vol. 1.
*Petiver*, Hortus Siccus Anglicus, vol. 1.
*Uvedale*, Herbarium Rayanum, vol. 1.
Moſſes and Plants by *Buddle*, *Vernon*, *Floyd*, *Cowrton*, &c.

the firſt thoſe plants are deſigned, the branches of which have the appearance of leaves growing diſtinct. Of theſe, *natans*, *ſanguineus*, and *ſinuoſus* have what any one would deem leaves, but, when attentively conſidered and compared with others, appear to be branches (the *fibrillæ* of Moriſon) growing up into, or dilated into, a thin membrane—In *membranifolius* it is very evidently ſo.

By the ſecond diviſion, *foliis unitis*, are deſigned thoſe which appear to have leaves united with and forming a part of the frons—Theſe leaves are only ſo in appearance, for in fact they are rudiments of branches, or more properly young branches themſelves. All the ramifications of F. *fibroſus* are produced from what appears to be a leaf dividing itſelf, and then ſoon loſing its original ſhape. This is ſtill more obſervable in F. *abrotanifolius*, as will be ſeen by referring to our deſcription of that plant. F. *fœniculaceus* alſo (*concat.* Fl Ang.) and F. *concatenatus* Linn. have branches which firſt appear under the form of linear leaves, afterwards branching out into minute ramifications. The concatenated veſicles which characteriſe theſe two plants, are merely formed from theſe leaves contracting themſelves at regular intervals, whilſt at the ſame time the coats of the leaf, in the intervening ſpaces, ſeparate, and thus form hollow veſicles. F. *ſiliquoſus* and *ſelaginoides* will give ſtriking proofs of the ſame kind.

SYNOPSIS.

SYNOPSIS SPECIERUM.

*Foliis distinctis.*

1. *F. natans.* Caule tereti ramosissimo; foliis lanceolatis serratis; vesiculis globosis pedunculatis.
2. *F. sanguineus.* Caule tereti ramoso; foliis simplicibus ovato-oblongis, obtusis, undulatis, integerrimis.
3. *F. sinuosus.* Caule tereti ramoso; foliis oblongis undulatis ramoso-sinuatis, spinoso-dentatis.
4. *F. Hypoglossum.* Caule alato ramoso; foliis linear-lanceolatis planis integerrimis proliferis.
5. *F. ovalis.* Caule tereti ramoso, rigidiusculo; foliis ovalibus carnosis.
6. *F. sedoides.* Caule tereti ramoso tenero; ramis dichotomis; foliis cylindricis utrinque attenuatis, superioribus confertis.
7. *F. dasyphyllus.* Caule tereti ramoso; ramis filiformibus subsimplicibus; foliis cylindricis obtusis, basi attenuatis, sparsis.
8. *F. membranifolius.* Caule tereti ramoso, apice membranaceo dilatato dichotomo; foliis enerviis sub-bilobis; tuberculis pedunculatis.

* *Kaliformis.*

* *Foliis unitis.*

9. *F. ligulatus.* Fronde planâ aveniâ sub-triplicato-pinnatâ; ramis ramulisque distichis; foliis linear-lanceolatis, spinoso-dentatis.
10. *F. siliquosus.* Fronde compressâ ramosâ; foliis distichis alternis oblongis; vesiculis pedunculatis oblongis articulatis mucronatis.
11. *F. abrotanifolius.* Fronde filiformi compressâ pinnatâ; ramulis extremis vesiculosis; vesiculis terminatis foliolis multipartitis obtusis.

12. *F.*

12. *F. barbatus.* Fronde filiformi ramoſiſſimâ, ramulis extremis apice tuberculatis tuberculis congeſtis foliolo ſubulato terminatis.
13. *F. ericoides.* Fronde filiformi ramoſiſſimâ; foliis ſubulatis, terminalibus confertis, arctè imbricatis, baſi tuberculiferis.
14. *F. granulatus.* Fronde filiformi ramoſiſſimâ debili; foliis ſubulatis laxiuſculè imbricatis baſi tuberculiferis; tuberculis contiguis.
15. *F. ſelaginoides.* Fronde filiformi ramoſiſſimâ debili; foliis ſubulatis remotiuſculis; veſiculis foliorum ſuperiorum baſi innatis.
17. *F. fœniculaceus.* Fronde filiformi ramoſiſſimâ; ramis ſub-dichotomis; foliis ſubulatis æqualibus; veſiculis oblongis concatenatis innatis.
17. *F. fibroſus.* Fronde filiformi ramoſiſſimâ; ramis primariis ſubdiſtichis; foliis filiformibus linearibuſque; veſiculis ſubrotundis innatis.

** *Alati, ſ. Fronde planâ, ſtipite medium folium percurrente.*

18. *F. tetragonus.* Fronde ſimplici enſiformi baſi rotundatâ; ſtipite alato quadrangulari.
19. *F. teres.* Fronde ſimplice enſiformi baſi attenuatâ; ſtipite alato tereti compreſſiuſculo.
20. *F. alatus.* Fronde membranaceâ tenerrimâ ramoſâ ſubdichotomâ.
21. *F. ſerratus.* Fronde dichotomâ ſerrato-dentatâ, apicibus planis tuberculatis obtuſis.
22. *F. veſiculoſus.* Fronde dichotomâ integerrimâ; veſiculis innatis axillaribuſque; apicibus tumidis tuberculatis acutiuſculis.
23. *F. ſpiralis.* Fronde planâ dichotomâ æquali; apicibus tumidis tuberculatis tumidis.

24. *F.*

24. *F. ceranoides.* Fronde planâ dichotomâ integerrimâ æquali; apicibus tumidiuſculis tuberculatis lanceolatis.

* *Dentatus, Rubens.*

*** *Fronde planâ aveniâ.*

25. *F. ſaccharinus.* Fronde ſimplice enſiformi.

26. *F. digitatus.* Fronde palmatâ, laciniis enſiformibus; ſtipite tereti; radice fibroſâ.

27. *F. bulboſus.* Fronde palmatâ, laciniis enſiformibus; ſtipite plano; radice inflato-bulboſâ.

28. *F. laceratus.* Fronde membranaceâ tenerrimâ ramoſâ; ramis ramuliſque ſublinearibus, apice obtuſis.

29. *F. dentatus.* Fronde membranaceâ tenerrimâ ramoſâ, alternatim pinnatifidâ; ramulis linearibus apice inciſis; lacinulis acutis.

30. *F. bifidus.* Frondibus membranaceis ſub-dilatatis bifidis, ſegmentis ſub-divaricatis obtuſis; tuberculis marginalibus diſtantibus.

31. *F. ciliatus.* Fronde ſub-membranaceâ ramoſâ; ramis lanceolatis acutis ciliatis, ciliis ſimplicibus brevibus.

32. *F. jubatus.* Fronde membranaceâ ramoſiſſimâ; ramis lanceolatis acutis ciliatis, ciliis ramoſis.

33. *F. palmatus.* Fronde membranaceâ variè diviſâ, palmatâ.

34. *F. rubens.* Fronde ſub-membranaceâ dichotomâ; ramis proliferis linearibus, ramulis apice dilatatis bifidis, laciniis acutiuſculis.

35. *F. pinnatifidus.* Fronde cartilagineâ ramoſâ; ramis patentibus ſub-duplicato-pinnatifidis, ramulis obtuſis calloſis.

36. *F. criſpus.* Fronde ſubmembranaceâ dichotomâ; ramis integris; tuberculis ſolitariis ſparſis.

**** *Fronde aveniâ hinc canaliculatâ.*

37. *F. canaliculatus.* Fronde dichotomâ lineari; apicibus obtuſis tuberculoſis.

38. *F.*

38. *F. patens.* Fronde dichotomâ lineari, apicibus obtuſiuſculis planis; tuberculis ſubgloboſis ſparſis.

39. *F. mammilloſus.* Fronde dichotomâ; ramis ſupernè dilatatis utrinque mammilloſo-tuberculiferis, apicibus acutis.

***** *Fronde compreſſâ.*

40. *F. loreus.* Fronde dichotomâ acutâ glabrâ, utrinque tuberculatâ.

41. *F. aculeatus.* Fronde ſubcartilagineâ ramoſiſſimâ dentatâ, dentibus marginalibus ſubulatis erectis.

42. *F. corneus.* Fronde cartilagineâ ramoſiſſimâ, ramis latioribus alternis, ramulis oppoſitis divaricato-adſcendentibus obtuſis.

43. *F. gigartinus.* Fronde cartilagineâ dichotomâ ramoſâ; ramis æqualibus acutis ſpinoſo-dentatis; tuberculis globoſis lateralibus ſeſſilibus.

44. *F. coronopifolius.* Fronde cartilagineâ ramoſiſſimâ; ramulis obtuſis multifidis ſub-confertis; tuberculis globoſis pedunculatis, ſeſſilibuſque.

45. *F. coccineus.* Fronde ſubcartilagineâ ramoſiſſimâ; ramulis ſubulatis ſecundis, tuberculis globoſis ſubſeſſilibus.

46. *F. plumoſus.* Fronde ſubcartilagineâ ramoſiſſimâ; ramis ſupradecompoſito-pinnatis; ramulis oppoſitis; tuberculis globoſis pedunculatis.

47. *F. nodoſus.* Fronde ſub-dichotomâ; foliis diſtichis obovatis integerrimis; veſiculis innatis ſolitariis fronde latioribus.

48. *F. obtuſus.* Fronde cartilagineâ ramoſiſſimâ; ramis ramuliſque ſub-oppoſitis, erectiuſculis, obtuſiſſimis, truncatis.

49. *F. lichenoides.* Fronde dichotomâ ramoſâ; ramis apice dilatatis; tuberculis globoſis terminalibus.

* *Criſpus. Var.* ε.

****** *Fronde tereti.*

50. *F. Filum.* Fronde filiformi ſimplice.
51. *F. tomentoſus.* Fronde filiformi ramoſâ tomentoſâ; ramis dichotomis apicibus anguliſque obtuſis.
52. *F. diffuſus.* Fronde filiformi dichotomâ articulatâ; ramis divaricatis diffuſis apice acutis.
53. *F. tuberculatus.* Fronde filiformi dichotomâ; ramis inæqualibus obtuſis apice tuberculatis, angulis ramificationum obtuſis.
54. *F. faſtigiatus.* Fronde filiformi dichotomâ ramoſiſſimâ; ramis faſtigiatis æqualibus obtuſis, angulis ramificationum ſub-rectis.
55. *F. radiatus.* Fronde filiformi dichotomâ ramoſâ; ramis ſubæqualibus acuminatis; tuberculis lateralibus; angulis ramificationum obtuſiuſculis.
56. *F. lumbricalis.* Fronde filiformi dichotomâ ramoſâ; ramis ſubæqualibus acuminatis, angulis ramificationum acutis.
57. *F. Kaliformis.* Fronde filiformi ſub-gelatinoſâ tubuloſâ ramoſiſſimâ; ramis ſparſis; ramulis ſub-verticillatis obtuſiuſculis.
58. *F. confervoides.* Fronde filiformi ramoſâ; ramis ſub-diſtichis ſub-ſimplicibus ſetaceis; tuberculis lateralibus ſemigloboſis.
59. *F. albidus.* Fronde filiformi ſub-dichotomâ ramoſiſſimâ; ramis ſubſecundis, tuberculis lateralibus ſubrotundis depreſſis.
60. *F. ſubfuſcus.* Fronde filiformi ramoſiſſimâ; ramis ſparſis, ramulis ſubulatis ſub-alternis; tuberculis racemoſis ſub-octoſpermis.
61. *F. pedunculatus.* Fronde filiformi pinnato-ramoſâ; ramis ſetaceis ſimplicibus; tuberculis oblongis pedunculatis ſparſis.
62. *F. aſparagoides.* Fronde filiformi ramoſiſſimâ; tuberculis globoſis, pedunculatis, ramulis ſubulato-ſetaceis alternatim oppoſitis.

63. *F.*

63. *F. tenuissimus.* Fronde filiformi ramosissimâ; ramis omnibus capillaribus alternis; ramulis acutis tuberculatis.
64. *F. articulatus.* Fronde membranaceâ filiformi tubulosâ concatenatim articulatâ ramosissimâ; ramis uniformibus dichotomis verticillatisque.
65. *F. Opuntia.* Fronde cartilagineâ subcompressâ solidâ, concatenatim articulatâ ramosâ; ramis uniformibus dichotomis.
66. *F. variabilis.* Fronde filiformi ramosissimâ; ramis subimbricatis, ramulis brevissimis fasciculatis acutis.
67. *F. pinastroides.* Fronde filiformi ramosissimâ; ramulis arctè imbricatis subulatis sub-secundis, apice incurvatis integris.
68. *F. Lycopodioides.* Fronde filiformi subsimplici; ramis subulatis subramosis undique imbricatis squarrosis.
69. *F. purpurascens.* Fronde filiformi ramosissimâ; ramulis setaceis sparsis; tuberculis subrotundis innatis.
70. *F. amphibius.* Fronde filiformi ramosissimâ; ramis alternis; ramulis capillaribus, apice involutis tuberculatis.
71. *F. plicatus.* Fronde filiformi dichotomâ ramosissimâ implexâ; ramulis subsecundis; tuberculis lateralibus terminalibusque.
72. *F. capillaris.* Fronde subquadripinnatâ; ramis ramulisque omnibus alternis, primariis longissimis, ultimis brevissimis fasciculatis tenuissimis.

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### 1. Fucus natans.

F. caule tereti ramosissimo, foliis lanceolatis serratis, vesiculis globosis pedunculatis. *Herb. Linn.—Buddle, p.* 33. *n.* 1. *Uvedale,* appendix, *p.* 84. *n.* 1. & *p.* 86.

*Linn. Sp. Pl.* 1628. *Fl. Ang. p.* 572. *Withering, vol.* 3. *p.* 234.

*Habitat* inter rejectamenta maris.

*Radix*, callus explanatus—*Frons* pedalis et ultra ramoſiſſima, caule ramiſque teretibus, frequentiſſimè retis inſtar implicitis—*Folia* alterna, ſeſſilia, variant longitudine 1-2-3 uncialia; et latitudinem modo vix linearem, modo pluſquam uncialem attinent, ideoque nunc lineari-lanceolata, nunc lanceolata, et nonnunquam ovali-lanceolata dici poſſint, formam autem qualemcunque lanceolatam ſemper conſervant. Foliorum margines conſtanter ſerrati, ſerraturis acutis diſtantibus—*Rami*, veſiculis globoſis pedunculatis, et frequentiſſimè proceſſubus ſtyliformibus terminatis, ſemper vacuis, veſtiti ſunt—Ramuli fructificationem ſuſtentantes, axillares, paniculati aphylli, tuberculis minutis quaquaverſùm obſiti—*Color* recentis plantæ flaveſcens, ſiccatæ purpureus, nigreſcens.

This plant, ſo well known by the name of *Gulf-weed*, to all perſons who navigate the Atlantic Ocean, is deſcribed by Linnæus as not being fixed by any root, and being only found floating looſely in the ſea. It does not appear that any perſon has hitherto detected it on its native rocks, notwithſtanding the immenſe quantities which are conſtantly ſeen between Europe and America; but we have deſcribed the root on the authority of the ſpecimen preſerved in the Linnæan Herbarium, and of Gmelin, who declares (p. 94), that he has in his poſſeſſion ſpecimens with fragments of the rock adhering, and one on which part of the orbicular baſe remains. The ſphærical veſicles with which this ſpecies always abounds, have been deſcribed as containing the fructification; but theſe are always empty, and are certainly only intended to give buoyancy to the plant, and to enable it conſtantly to remain on the ſurface of the waves. The actual

actual fructification is noticed by Linnæus, though he ſtill ſeems to have conſidered the veſicles as performing that function. It conſiſts of ſmall, naked, paniculated ramuli, not more than half an inch in length, ſituated in the boſom of the leaves, and entirely covered with minute tubercles: or theſe may probably be merely congeries of tubercles aſſuming that form; as theſe panicled branches are never obſerved, except when the plant is in fructification, nor otherwiſe than covered with tubercles. The veſicles are often naked; but ſometimes they are terminated by a ſetaceous or ſubulate proceſs reſembling a ſtyle, which is nothing more than the footſtalk continued beyond the veſicle. Many intereſting particulars relating to this extraordinary plant, collected from various authors, are mentioned by Gmelin; for which we refer the curious reader to that work, as it would occupy too much room, and be foreign to our deſign to record them here.

Lourreir in his *Fl. Cochinchinenſis* ſpeaks of this plant. He advances nothing new upon the ſubject. Indeed he ſeems to know but little of this genus, having noticed only ſeven ſpecies.

### 2. Fucus sanguineus.

F. caule tereti ramoſo, foliis ſimplicibus ovato-oblongis obtuſis undulatis integerrimis. *Herb. Linn.*

*Mor. Hiſt. Oxon.* 3. *p.* 645. *ſ.* 15. *t.* 8. *f.* 6. *R. Syn. p.* 47. *n.* 35. *Fl. Dan.* 349. *Gmelin, p.* 185. *t.* 24. *f.* 2. *Linn. Syſt. Fl. Ang. p.* 573. *Fl. Scot. p.* 942. *Withering, vol.* 3. *p.* 235.

*Habitat* in rupibus et ſaxis marinis.

Adhæret rupibus callo ſolido difformi—*Frons* ſemipedalis, etiam pedalis, purpurea, diaphana—*Caulis* brevis, teres, pro magnitudine plantæ

plantæ variat, nunc craſſitiem pennæ corvinæ, nunc anſerinæ minoris æquans; modo ſemel, modo bis iterumve ramoſus—*Rami* petiolorum funguntur vice, et foliis membranaceis, tenerrimis, ſimplicibus, ovato-oblongis, obtuſis, quorum margines elegantiſſimè undulati ſunt, terminantur—*Folium* nervus craſſiuſculus percurrit, aliis minoribus oppoſitis vel alternis ramoſis, pinnatus; nonnunquam è nervo primario petiolus prodit, folium alterum quaſi proliferum formans—*Fructificatio*, tubercula ſphærica pedunculata, atro-purpurea in petiolis, rarius in nervis foliorum ſita.

This plant may undoubtedly be conſidered as the moſt beautiful of the whole genus. The elegant form, the waved margins, and delicate veining of the leaves will readily diſtinguiſh it from all its congeners. The ſubſtance of the ſtem is cartilaginous, that of the leaves membranaceous, extremely thin and tender; the whole is generally diaphanous, though in a very advanced ſtate the ſtem is ſometimes opake. It frequently is only ſimply branched; the ſtem is then very ſhort, and bears a few leaves, each ſupported on a ſhort footſtalk: others are very much branched, but in theſe the ſeparate branches ſoon terminate, and form footſtalks to the leaves: in the former ſtate it is well repreſented by *Gmelin*, and in the latter is very well figured in *Fl. Dan.* The leaves vary from three or four inches to a foot in length, and from half an inch to two or more in breadth. The footſtalk is nearly round, but is continued through the leaf, where it is compreſſed, and forms a ſtrong midrib, which is pinnated with others very ſlender, and either ſimple or branched at the baſe. Theſe are ſometimes alternate, but more frequently oppoſite, as repreſented in *Fl. Dan.* though they are very rarely ſo conſpicuous, or ſo much branched as in that figure. Sometimes the leaf becomes proliferous, a footſtalk ariſing from the midrib, and

and forming a new leaf, ſimilar to, and nearly as large as, that from which it iſſues. The fructification, which is rarely met with, conſiſts of minute round tubercles, each ſupported on a ſhort peduncle, and when filled with ripe ſeeds of a dark purple colour, nearly black, ſituate on the footſtalks of the leaves. Similar tubercles are ſometimes obſerved placed on the midrib of the larger leaves. It adheres to the rocks by a ſmall, thick, ſolid, but knobbed and miſhapen calloſity, and is found on various parts of the Britiſh coaſt. We have met with it at Sidmouth in Devonſhire, and Falmouth in Cornwall; and it has alſo been thrown up along with other rejectamenta upon the ſandy ſhore at Yarmouth in Norfolk.

### 3. Fucus sinuosus.

F. caule tereti ramoſo, foliis oblongis undulatis ramoſo-ſinuatis ſpinoſo-dentatis. *Buddle, p.* 26. *n.* 3. *Uvedale, p.* 12. *n.* 3. *R. Syn. p.* 47. *n.* 34. *Fl. Dan. t.* 652.

Fucus crenatus. *Gmelin,* 184. *t.* 24. *f.* 1.

Fucus rubens. *Fl. Ang. p.* 573. *Fl. Scot. p.* 943. *Withering, vol.* 3. *p.* 235.

Var. β foliis ſubcartilagineis dentatis.

*Habitat* in littoribus marinis ubique; β apud Cromer Norfolciæ.

Adhæret rupibus callo paululum explanato—*Frons* palmaris, rubra—*Caulis* filiformis, teres, craſſitie fili emporetici minoris, ramoſus—*Folia* ſub-oppoſita membranacea, tenera, obovata, crenata crenis diſtantibus, ſeſquiuncialia, nervoſa—*Nervus* primarius medium folium percurrens, aliis conſtanter oppoſitis pinnatus eſt—maturâ plantâ folia prolifera evadunt; ſcilicet nervi laterales elongati, et demum foliorum oblongorum primarii fiunt; exinde mar-

gines, necnon, ſed rarius, utriuſque paginæ nervi, proceſſubus dentato-ſpinoſis tuberculiferis armati ſunt.

From the examination of the Linnæan Herbarium it appears, that this elegant ſpecies was entirely unknown to Linnæus, and that the *rubens* of *Sp. Pl.* and his other works is the plant which is called *criſpus* in the *Flora Anglica*, and *prolifer* in the *Flora Scotica*. We have therefore been under the neceſſity of giving a new name to this ſpecies.

The different appearances of this plant in the different ſtages of its growth, render it very difficult to give a deſcription by which it may be recogniſed at all ages, and at the ſame time to avoid that prolixity which is ſo repugnant to the principles laid down in the *Philoſophia Botanica*.

In its young ſtate, it preſents a branched frond with obovate crenated leaves, extremely reſembling in ſhape the young leaves of the oak; whence its Engliſh name. After this the lateral nerves ſhoot out, the *crenæ* are formed into deep fiſſures, and the ſeparate leaves put on a pinnatifid appearance, with ſomewhat linear ſegments. In the change from one of theſe ſtates to the other, it is excellently figured *Fl. Dan.* 652, where both ſorts of leaves are repreſented. *Gm.* 24. 1. repreſents it in a more advanced ſtate, but very indifferently.

In maturity, the whole margin of the frond is cloſely fringed with what appear to the naked eye to be minute ſpines or cilia, and which examined with a common eye-glaſs in a ſtate of fructification might be ſuppoſed lanceolate pedunculated tubercles; but which when highly magnified are found to be dentated proceſſes of the leaf, in which are imbedded minute tubercles replete with ſeeds.

In

In some of the older specimens, but very rarely, these processes are also to be seen on the nerves, as well lateral as principal, on each surface of the leaf; and even on the naked nerve, where it has been deprived of its membrane. When in this state they are of different sizes, and clearly shew themselves to be really proliferous leaves, evincing the remarkably strong reproductive property possessed by this species, to which the various forms in which it appears are principally owing; for, in a very advanced state, it frequently happens that the membranaceous part of the leaf is much torn and destroyed, the ribs then appear like branchings of the stem, and from every part of them young leaves are seen to arise, and even from the ribs and nerves of the decaying leaves.

The whole plant is bright red, the leaves membranaceous, extremely thin and delicate; the fructification deep red, when ripe nearly black.

*β.* a variety occurs, though rarely of a substance approaching to cartilaginous, in which the processes on the margin are more distant, much larger, and appear flat to the naked eye, shewing themselves to be teeth and not spines or cilia, each having, when in fructification, a larger and more conspicuous tubercle imbedded in it. We have met with this variety only at Cromer on the coast of Norfolk.

### 4. Fucus Hypoglossum.

F. caule ramoso alato, foliis lineari-lanceolatis planis integerrimis proliferis. *Linn. Trans. v.* 2. *p.* 30. *t.* 7.

F. Hypoglossum—F. lingulatus. *Solander* in Herb. Bankf.

*Habitat* in rupibus submarinis satis frequens.

*Radix* callus minimus crassus—*Frons* 2—3 uncialis lætè rubra,

membranacea tenerrima—*Caulis* breviſſimus, teres, filiformis ramoſus, ramis membranâ tenuiſſimâ utrinque alatis—*Folia* membranacea plana, integerrima, figurâ magnopere variant; plerumque linearilanceolata ſunt, ſæpe autem linearia, lanceolata; nonnunquam ad formam ovalem accedentia inveniuntur. Folia adultiorum percurrit coſta craſſiuſcula, ex quâ oriuntur folia plurima prolifera, et ex his iterum iterumque alia, poſtrema ſemper lanceolata—*Fructificatio*, tubercula parva ruberrima, in ipsâ coſtâ ſita—Occurrunt etiam ſpecimina in quibus tubercula nulla in coſtis adſunt, ſed granula minutiſſima rubra in membranâ ad utrumque coſtæ latus ſeriatim diſpoſita obſervantur.

This elegant ſpecies cannot be confounded with any other in this diviſion, or indeed in the whole genus; the perfectly entire leaves, repeatedly proliferous, and always from the midrib, with the total abſence of lateral nerves, ſufficiently diſtinguiſhing it.

The ſtalk, and the ſhort branches, from which the leaves ariſe, are winged with a thin membrane in the younger plants; and from this circumſtance, in a former volume of theſe Tranſactions, it was propoſed to place it in the order *Alati:* but in the older ſpecimens this membrane is frequently wanting; and the leaves being as completely diſtinct as in *ſanguineus*, or any other ſpecies in this diviſion, it has been thought moſt conſonant to the general arrangement to place it here.

The twofold appearance of the fructification requires particular obſervation. In ſome plants conſpicuous tubercles of a deep red colour, and evidently filled with ſeeds, are to be obſerved on the midrib—in others, only very minute red dots, diſpoſed in parallel lines, upon the membrane on each ſide of the midrib; and theſe different appearances have never been obſerved on the ſame plant.

In

In conſequence of this, the celebrated Dr. Solander, in a manuſcript preſerved in the library of Sir Joſeph Banks, has deſcribed them as two different ſpecies; at the ſame time expreſſing his doubts whether they might not be male and female of the ſame ſpecies. In the preſent imperfect knowledge of the nature and properties of marine plants, it is impoſſible for us to determine this point; and from the impracticability of examining theſe plants whilſt actually growing in their native element, it is probable that the manner in which the impregnation is performed may ever remain among the arcana of nature. We cannot however doubt, but that both theſe appearances are that of female fructification: for in F. *alatus*, and ſome other ſpecies, granules as well as tubercles are obſerved; and they have been traced from one to the other, ſo as to allow us to conclude that the granules are the firſt viſible appearances of the female fructification, and that ſome of them ſwell into tubercles, whilſt others are abortive and diſappear. It is extremely probable that theſe circumſtances alſo take place in this ſpecies: the only objection to it is, that the granules for the moſt part appear on the membranaceous parts, and the ſeed-bearing tubercles are never found in any other ſituation than on the midrib.

That theſe granules are ſeeds eſcaped from, or expoſed by the deciduous coats of the tubercles, as ſuggeſted in the former deſcription of this plant, is improbable, from the regularity of their diſpoſition, and the ſpace which they ſo regularly cover in every ſpecimen which has been obſerved, though we have reaſon to ſuppoſe that one of theſe circumſtances does take place in a ſpecies recently diſcovered by the ingenious Mr. Stackhouſe, a member of this Society, and which will be deſcribed by him.

In this ſtate of uncertainty we muſt conclude the ſubject, with allowing that it is not impoſſible, but that theſe plants, though ſo

perfectly ſimilar in appearance, may be, as ſuppoſed by Dr. Solander, really diſtinct ſpecies, and recommending to botaniſts ſituated on the ſhores where they are found, to obſerve them carefully at all ſeaſons. It may be proper to notice, that the ſpecimens which have been found plentifully on the Norfolk coaſt, have all been of the tuberculated ſort; and that theſe have been but rarely met with on the weſtern coaſt, where the granulated ſort is very frequent.

### 5. FUCUS OVALIS.

F. caule tereti ramoſo rigidiuſculo, foliis ovalibus carnoſis.
*Jacquin Collect. v.* 3. *t.* 13. *f.* 1.
*Fl. Ang. p.* 578. *Withering, vol.* 3. *p.* 235.
*Habitat* in rupibus marinis in Inſulâ Portlandicâ—propè Exmouth.

*Radix* fibroſa—*Frons* 3—4 uncialis, rubra—*Caulis* teres, filiformis, rigidiuſculus, craſſitie fili emporetici minoris, ramoſus—*Rami* pauci ejuſdem ac caulis craſſitiei et ſubſtantiæ, patentes—*Folia* ovalia valdè carnoſa, ſubgelatinoſa, tres lineas longa, vix ſeſquilineam lata, ſæpiùs ſeſſilia, nonnunquam petiolo breviſſimo inſtructa, nunc alterna, nunc ſparſa, infernè rariora, apicem frondis verſus ſub-conferta—*Fructificatio*, tubercula parva, ex rubro nigreſcentia in foliis præſertim inferioribus ſparſa, exſerta, necnon ramis adhærentia.

This elegant ſpecies is diſtinguiſhed from *ſedoides* by its more rigid and patent branches, and by the ſhape of its leaves, which are more thinly ſcattered below, but ſomewhat crowded upwards. It is farther diſtinguiſhed by the fructification, which conſiſts of much larger and fewer tubercles than in *ſedoides*, ſituated upon the ſurface of the leaves, from which they viſibly project. The diſtinctions

tions between this and *daſyphyllus* are ſufficiently pointed out under that ſpecies.

From the ſpecific characters and deſcriptions given of this plant, and *ſedoides* which follows it, they cannot but be conſidered as perfectly diſtinct; but a confuſion has ariſen from Mr. Hudſon's having quoted two different ſpecies of Gmelin for this plant, which was probably occaſioned by his having never ſeen *ſedoides*. Mr. Lightfoot certainly conſidered them as diſtinct, having quoted Gmelin's *vermicularis*, and taken no notice whatſoever of his *polypodioides*, or the *ovalis* of Hudſon.

That the *polypodioides* of Gmelin ought to be referred to this ſpecies cannot be doubted, when it is conſidered that he inſerts it ſolely on the authority of Martyn, whoſe figure is very indifferent, and who has given no deſcription. As to his deſcribing the leaves as membranaceous inſtead of fleſhy, that ought to have no weight, as the dried ſpecimens muſt always have that appearance. It is owing to this alſo that Gmelin has erroneouſly placed this ſpecies amongſt his membranaceous *fuci*, when it certainly ought to have been placed next to *vermicularis*.

Sometimes largiſh ſolitary tubercles are obſerved adhering to the main branches and to the leaves alſo. This we deem the true form of the fructification. It is very rarely to be met with in this ſituation.

### 6. Fucus sedoides.

F. caule tereti ramoſo tenero, ramis dichotomis, foliis cylindricis utrinque attenuatis ſuperioribus confertis. *Reaumur, Act. Gall.* 1712. *p.* 40. *t.* 4. *f.* 8.

Fucus vermicularis. *Gm. p.* 162. *t.* 18. *f.* 4. mala. *Fl. Scot. p.* 958.

*Habitat*

*Habitat* in rupibus Inſularum Juræ. *D. Lightfoot.* Inter rejectamenta maris apud Yarmouth Norfolciæ legimus.

*Radix* callus paululum explanatus—*Frons* triuncialis ex albo virescens, nonnunquam etiam rubeſcens, tenera—*Caulis* teres, filiformis, craſſitie fili emporetici minoris, ramoſus—*Rami* dichotomi, ſubdivaricati, caule vix tenuiores—*Folia* cylindrica utrinque attenuata, nonnunquam bifida, ſparſa, ad ſuperiorem frondis partem confertiſſima, gelatinoſa—*Fructificatio*, tubercula numeroſiſſima, minutiſſima, lætè rubra, in foliis præſertim ſuperioribus ſita.

This ſpecies is ſufficiently diſtinguiſhed from its affinities, *ovalis* and *daſyphyllus*, in the deſcriptions of thoſe plants. That it has been confounded with *ovalis* cannot be doubted by any one who conſiders the deſcriptions of Hudſon and Lightfoot, and compares them with the account given by Gmelin in his *Hiſt. Fucorum* (p. 162—186) of his two ſpecies, *vermicularis* and *polypodioides*. Mr. Lightfoot's accurate deſcription of *vermicularis* clearly points out this plant; and though it was not neceſſary for him to mark any diſtinctions between this and Mr. Hudſon's *ovalis*, it is certain he conſidered them diſtinct, from his not quoting *ovalis* as a ſynonym, or taking any notice of Gmelin's *polypodioides*.

The ſhape and growth of the leaves very much reſemble the *Sedum album* of Linn. as obſerved in *Fl. Scot.* ; and this has induced us to give to this ſpecies the trivial name of *ſedoides*, inſtead of the unmeaning one of *vermicularis*, which had been adopted from Gmelin.

The whole plant is more tender and gelatinous than *ovalis*, and the fructification differs conſiderably, conſiſting of extremely minute red tubercles, placed on the leaves, particularly the upper ones, and ſcarcely riſing above the ſurface. In this circumſtance it nearly approaches the genus *Ulva* ; but when it is conſidered that the

the fructification is not diſtributed over the whole of the frond, and, though ſituated almoſt within the ſurface, is not actually immerſed, and that not any is to be found in the internal ſubſtance of the leaves, the propriety of placing it in the genus *Fucus*, will ſcarcely be diſputed.

We have never found it in a growing ſtate, but have gathered it amongſt other rejectamenta on the beach at Yarmouth in Norfolk; we cannot therefore ſpeak with certainty of its mode of growth, but have ventured to deſcribe the root as diſcoid on the authority of Gmelin.

### 7. Fucus dasyphyllus.

F. caule tereti ramoſo, ramis filiformibus ſub-ſimplicibus, foliis cylindricis obtuſis baſi attenuatis ſparſis.

*Linn. Tranſ. vol.* 2. *p.* 239. *t.* 23. *f.* 1. 2. 3.

*Habitat* in rupibus et ſaxis marinis apud Cromer Norfolciæ.

Adhæret rupibus diſco paululum explanato, ſurculos emittente, unde novæ frondes oriuntur—*Frons* ſolitaria ſeu gregaria, ſub-cartilaginea tenera, teres, filiformis, rubra, ſtatim ramoſa—*Rami* filiformes, ſub-ſimplices, craſſitie fili emporetici minoris, ad baſin ſubnudi, dein foliacei, apicibus obtuſis—*Folia* cylindrica, ſub-gelatinoſa, ſeſſilia, apice obtuſiſſima, baſi valde attenuata, 1—4 lineas longa, ſemilineam lata, inferiora longiora, ſuperiora breviora, frequentiſſimè aliorum minorum prolifera, pallidè rubra nonnunquam viridantia—*Fructificatio*, tubercula minutiſſima, ruberrima, ſparſa, ad inferiorem ramorum partem, aliquandò etiam ſed rariùs in foliis ſita.

This ſpecies is diſtinguiſhed from *ovalis* and *ſedoides*, the only ones in this ſub-diviſion to which it has any affinity, by the

ſhape of the leaves, and by the fructification, which in the two latter is uſually on the leaves, but in this is very rarely found in that ſituation, but is ſcattered on the lower branches where they are deſtitute of leaves.

In a deſcription given of this plant in a former volume of the Linnæan Tranſactions, it is hinted that probably this ſpecies and *ovalis* ought rather to be placed in the diviſion *fronde tereti;* and moſt certainly this in particular has great affinity with ſome of the plants in that diviſion, the leaves being nearly of the ſame ſubſtance as the reſt of the frond, and the tubercles being principally ſituated on the naked branches. But on more mature conſideration, we are convinced that *ovalis* cannot properly be arranged in any other diviſion than the preſent, the ſhape of the leaves, and their ſomewhat compreſſed ſurface, abſolutely forbidding it; and the very great affinity which ſubſiſts between *daſyphyllus*, *ovalis*, and *ſedoides*, requires that they ſhould be placed together. This muſt therefore be conſidered as adding one more to the numerous proofs of the impoſſibility of confining the endleſs variety of nature within the bounds of any artificial ſyſtem.

It grows, but not very abundantly, on the rocks and ſtones at Cromer on the coaſt of Norfolk, and has been found on various other parts of the Britiſh coaſt.

### 8. FUCUS MEMBRANIFOLIUS. TAB. 16. *Fig.* 1, 2.

F. caule tereti ramoſo apice membranaceo dilatato dichotomo, foliis enerviis ſub-bilobis, tuberculis pedunculatis.

Var. β *radicans*—foliis baſi incraſſatis ſanguineis. *Buddle, p.* 27, *n.* 6.

Var. γ *lacer*—foliis æqualibus ſub-linearibus. *Buddle, p.* 27, *n.* 1. 4. *Mor.*

Linn. Trans. III. tab. 16. p. 120.

fig. 1.

fig. 2.

F. membranifolius.

M.S.G. delin.

*Mor. Hiſt. Oxon.* iii. *p.* 648. *ſ.* 15. *t.* 9. *f.* 2. *R. Syn. p.* 44. *n.* 19.

Fucus Pſeudoceranoides. *Gmelin. p.* 119. *t.* 7. *f.* 4.

Fucus ceranoides var. γ lacerus. *Fl. Ang. p.* 583. *Fl. Scot. p.* 916. *Withering, vol.* 3. *p.* 249.

Var. δ *fimbriatus*—foliis ciliatis. *Fig.* 2.

Fucus fimbriatus. *Fl. Ang. p.* 574. *Withering, vol.* 3. *p.* 236.

*Habitat* in rupibus et ſaxis ſubmarinis.—Var. δ in Inſulâ Portlandicâ, ſed rariùs.

*Radix*, diſcus explanatus—*Caulis* 2—9 uncialis, ſubdichotomus, ramoſus, baſi nudus, ſimplex, teretiuſculus, ſupernè folioſus, ramoſus, compreſſus—*Rami* omnes ad latera folia membranacea, ſemuncialia, dilatata, breviter petiolata, rubra gerunt; apex in membranam breviuſculam, dilatatam, rubram, variè dichotomam abit—Hæc membrana foliorum formam omnino refert—*Folia* lateralia ſæpe ſimplicia, modo biloba; horum lobi, tum membranæ terminalis, obtuſi ſunt—*Fructificatio*, tubercula, ad latera ramorum ſita, parva, ovata, compreſſa, glabra, breviter pedunculata, pedunculo compreſſo, ſeminibus rubris fœta.

Var. β in omnibus fere α ſimillima eſt, at lobi foliorum, membranæque terminalis ſæpiùs acutiuſculi—*Rami*, antequam in membranam abeunt, longius protenſi ſunt, et inde radicibus, quæ ex cauliculis plantarum repentibus prodeunt, haud abſimiles. Quod autem præcipuè obſervandum, baſis foliorum, tum etiam membranæ terminalis, incraſſatur, et colore ſanguineo, ſive crudæ carnis, notabilis.

Var. γ folia, et membranæ terminalis diviſuras, tenuiores et acutiuſculas habet—Paulò altiùs creſcit—*Fructificatio*, eadem ac in var. α.

Var. δ—*Folia* omnia et membrana terminalis longiora ſun quam in præcedentibus; porro ciliata; at ne veſtigium quidem fructifi-

cationis nobis cilia viſa ſunt dare—*Ramuli* aphylli protenſi ſunt ut in var. β—Lobi foliorum et membranæ terminalis acuti admodum.

The firſt variety is found upon the coaſt of Norfolk, the ſecond and third are very general, the fourth has been gathered by us only on the iſle of Portland.

Mr. Hudſon, from obſerving the branches at length terminating in a dilated membrane, claſſed the third variety with his *Ceranoides* in his diviſion *fronde planâ aveniâ*. At the ſame time the fourth variety was placed in his diviſion *foliis diſtinctis*; as, in good truth, that and all the other varieties, from their having ſo perfect a reſemblance of petiolated leaves, ought to have been. Perhaps, ſtrictly ſpeaking, theſe petiolated leaves are only young branches, ending, like the larger ones, in a dilated membrane.

There is no danger of its being miſtaken for any other *Fucus* in this diviſion, being kept perfectly diſtinct by its nerveleſs dichotomous leaves, and terminal membrane.

In Gmelin's figure the tubercles are repreſented ſeſſile, in our ſpecimens they are all pedunculated; from the narrowneſs of the frond, that as well as Moriſon's figure is more applicable to our third variety than the firſt. The ſyn. of Moriſon quoted by Gmelin ought to be excluded. Whoever will take the trouble to conſult Moriſon, will immediately find that he is ſpeaking of a plant of an entirely different order.

The *cilia* on the edges of the fourth variety appear to be a ſort of *luſus naturæ*, to be the rudiments of leaves or membranes, and to have no concern in the production of any thing relating to the fructification. In all our ſpecimens the fructification is produced on the branches, and is always ſupported by a very ſhort peduncle.

The

The colour of this *Fucus* varies—ſometimes it is of a light red—ſometimes it appears herbaceous and green—at other times it is found of a parchment colour, and even white, owing to its having been expoſed to the ſun when caſt up upon the ſhore. In the ſecond variety the baſe of the leaves and terminal membrane keeps its colour of blood or raw fleſh in all expoſures.

### 9. Fucus ligulatus.

F. fronde planâ aveniâ ſub-triplicato-pinnatâ, ramis ramuliſque diſtichis, foliis lineari-lanceolatis ſpinoſo-dentatis. *Fl. Scotica, p.* 946. *pl.* 29.—*With.* 3. *p.* 248.

F. herbaceus. *Fl. Anglica, p.* 582.

Inter rejectamenta maris apud Weymouth, Exmouth, et in Inſulâ Portlandicâ, necnon apud Yarmouth in Norfolciâ.

*Radix* —— *Frons* valde ramoſa, pallidè vireſcens, tenuis admodum et pellucida, plana avenia—*Caulis* primarius rectus perpetuus, latiuſculus, ſpinulis et ramis diſtichis divaricatis—Hi rami in ramulos ſæpe multoties dividuntur, omnes ejuſdem ac primarius naturæ et ſubſtantiæ—Tandem quaſi in foliola abeunt lanceolato-linearia, marginibus ſpinoſo-dentatis—Altitudo 1—3 pedalis et ultra—*Fructificatio* hodie latet.

This plant grows uſually in very deep water, and is to be met with only when the force of ſome current has ſeparated it from its native rock. We never remember to have ſeen an entire plant with its root. The fragments which we have ſeen have been ſometimes more than a yard in length, and branching out to a conſiderable extent. Mr. Lightfoot's figure (which is of a very ſmall fragment) is executed with great fidelity. His deſcription is very

good, except with reſpect to the expanſion of the plant, which he confines to ſix or eight inches; his own figure repreſents it much larger. Large ſpecimens extend to nearly or quite two feet, or even more.

Its green colour induced Mr. Hudſon to call it *herbaceus*—Mr. Lightfoot's name *ligulatus* was prior, and is more characteriſtic; we have therefore reſtored it.

When carefully expanded it makes a very beautiful appearance. We have never ſeen any thing like fructification upon it. Its texture borders very cloſely upon that of *Ulva*, which we almoſt ſuſpect it to be; but the ſpinoſity of the leaves connects it with *Fucus*. It may ſerve perhaps as the link connecting theſe two genera. The main ſtalk produces all its branches, which are very ramoſe, in a diſtich order, and beſides is beſet with numerous but diſtant ſpines or ſubulate rudiments of branches. The laſt diviſions, which from their appearance we denominate leaves, (and under which idea we refer this plant to the diviſion *foliis unitis*,) are beautifully ciliated with minute ſpines or leaves, which are again alſo themſelves ciliated.

It ſeems ſomething extraordinary that none of the older botaniſts have noticed this plant.

### 10. FUCUS SILIQUOSUS.

F. fronde compreſſâ ramoſâ; foliis diſtichis alternis oblongis; veſiculis pedunculatis oblongis articulatis mucronatis. *Buddle*, *p.* 15. *n.* 1. *Uvedale*, *p.* 1. *n.* 2. and *p.* 5. *n.* 1, 2. *Buddle and Vernon*, without fructification, *p.* 22. *n.* 3.

*Gmelin*, *p.* 81, *t.* 2 B. *Fl. Dan.* 106. *Act. Pariſ.* 1772 partie 2de, *pl.* 4. *f.* 22. l-m-n-o-p-q. in fructification—the root, *f.* 20, 21.

*R. Syn. P.* 48. *n.* 39. *Linn. Sp. Pl.* 1629. *Fl. Ang. p.* 574. *Fl. Scot. p.* 921. *Withering*, 3. *p.* 236.

*Habitat* in rupibus et ſaxis marinis paſſim.

*Radix*, callus expanſus, qui autem in plantis provectioribus ſæpe conoideus, ligni inſtar durus—*Frons* cartilaginea valde ramoſa compreſſa, ramis ramuliſque diſtichis alternis, 1—4 pedalis, glaberrima—*Rami* ramulique modo valde diſtantes, modo conferti. Ad latera ramorum ramulorumque folia oriuntur, diſticha omnia, plana, nervo medio obſoletiuſculo, oblonga, quæ mox ſiliquarum inſtar intumeſcunt—Ergo ante fructificationem, folia quaſi jure ſuo appellentur, intumeſcentia autem veſiculæ—Ex his veſiculis quædam grandiores evadunt, articulatæ, cellulis 9—12 cavis vacuis. Aliæ minores ad apicem ramorum omnino ſolidæ, diſſepimento medio longitudinali. Intus ad latera ſeminum minimorum congeries plurimæ—*Veſiculæ* omnes oblongæ, et mucronatæ, ſive apice producto obtuſiuſculo—*Color* olivaceus.

There is no need of labouring the deſcription of this plant, as it in fact has no rival; its pod-like leaves or proceſſes being a peculiar diſtinction.

We were ſurpriſed to find at Weymouth large plants of this ſpecies thrown up by the ſea entirely void of all fructification, or indeed any approaches to it; the leaves being lengthened to a very conſiderable degree, and exceedingly narrow and thin.

The proceſſes which we call leaves, after ſome time thicken and ſwell, and aſſume the form of pods. We have examined a great number of them, and have always obſerved the generality of the older ones to be hollow, cellular, and void of ſeeds. Thoſe placed towards the extremities of the branches are cartilaginous and ſolid,

with

with a ſtrong partition running up the middle, and cluſters of ſeeds adhering to the ſides of the pods on the inſide. In the hollow cellular pods, traces of this diſſepiment or partition are to be obſerved; one largiſh and ſeveral very ſmall filaments running throughout longitudinally, and connecting all the cells. Whether theſe cavities ariſe from their having ſhed their ſeeds, or from the abortion of them, may be an object worthy of the attention of thoſe who have an opportunity of watching them through the ſeveral ſtages of their growth. It is obſervable that the leaves, as they are called, have all a rib or nerve paſſing up the middle; when the fructification takes place and the leaf ſwells, this rib becomes a partition line or diſſepiment.

The pods are very liable to be broken off by the force of the waves. The plant often aſſumes a very diſguiſed form from this accident; oftentimes not a ſingle pod or leaf remains throughout the whole frond. Here botanical experience aſſumes its due conſequence.

### 11. FUCUS ABROTANIFOLIUS.

F. fronde filiformi-compreſſâ pinnatâ, ramulis extremis veſiculoſis, veſiculis terminatis foliolis multipartitis obtuſis. *Herb. Linn.*

*Linn. Sp. Pl.* 1629. *Fl. Ang.* 575.

*Habitat* in mari Anglico. *Leofling.*

*Radix* ———. *Frons* filiformis aliquantulum compreſſa, craſſitie pennæ corvinæ, ſemipedalis—*Folia* pinnata ſub-alterna, pro ſitu varia; inferiora ſcilicet ſimplicia, linearia, dentata; dein pauca pinnatifida; cætera ramoſiſſima et ſupradecompoſita ſegmentis filiformibus—Folia ſuperiora veſiculoſa ſunt, veſiculis concatenatis, foliolis

 mukti-

multipartitis obtuſis terminatis—*Fructificatio*, tubercula minuta in foliolis terminalibus, et in ipſis veſiculis ſeminifera—*Color* recentis plantæ olivaceus, ſiccatæ niger.

This ſpecies has been involved in great doubt and obſcurity: but the inſpection of the Linnæan Herbarium, in which the actual ſpecimen gathered by Leofling on the Britiſh coaſt is preſerved, has entirely removed the difficulty.

The ſpecific character and deſcription given above were made from a young and vigorous ſpecimen brought from the Mediterranean, in which all the leaves were whole, and had apparently all their moſt minute ramifications. That in the Linnæan collection, and from which Linnæus himſelf formed his ſpecific character, is a much older one, in which the lower linear leaves and the fine of the upper ones are broken off; as is the caſe with moſt ſea plants when long expoſed to the action of the waves.

In the ſecond Mantiſſa this ſpecies is referred to *Fucus capenſis*, *Gm.* 157. *t.* 17. *f.* 1.; but certainly erroneouſly, as is evident from the Linnæan ſpecimen before mentioned, than which nothing is more unlike *capenſis*.

It differs from *barbatus* in having veſicles, and in ſome other particulars which are pointed out under that ſpecies. It agrees with *fœniculaceus*, in having frequently one or more leaves growing from the ſides of the veſicles; but differs in having theſe leaves conſtantly obtuſely terminated, whilſt thoſe of *fœniculaceus* are always ſubulate. It differs alſo from the latter in the ſhape of the lower leaves and in colour.

We have never met with this ſpecies in a growing ſtate; but have deſcribed it as an Engliſh plant on the authority of Leofling's ſpecimen in the Linnæan Herbarium, and from having ſeen it among the

the remains of Mr. Hudſon's collection, now in the poſſeſſion of A. B. Lambert, Eſq. F. L. S.

### 12. FUCUS BARBATUS.

F. fronde filiformi ramoſiſſimâ, ramulis extremis tuberculatis, tuberculis congeſtis foliolo ſubulato terminatis.

Fucus fœniculaceus. *Gmelin, p.* 86. *t.* 2. A. *f.* 2.

Fucus fœniculaceus. *Fl. Ang.* 575. *Withering, vol.* 3. *p.* 238.

*Habitat* in rupibus et ſaxis ſubmarinis, in Devonia. *Hudſon.*

*Radix* ——————. *Frons* teres filiformis 6—8 uncialis, craſſitie pennam corvinam vix æquans, ſtatim a radice ramoſa, ramis iterum inordinatim ramoſiſſimis, ramulis ſupremis tenuiſſimis tuberculatis —*Tubercula* aliquando ſolitaria, frequentiſſimè in formam ovalem congeſta, haud raro ſuprema bifida; cuncta in juniore æque ac perfectiori plantâ foliolo ſubulato terminata, quod autem in ſeneſcenti frequenter deeſt—*Color* recentis plantæ luteſcens, vel ex luteo rubeſcens, ſiccatæ nigerrimus.

After the account which has been given of *fœniculaceus*, it will not be ſurpriſing that this plant ſhould alſo have been the ſubject of much error; and that it ſhould have been deſcribed as bearing veſicles or air bladders; which has tended to confound it, not only with *fœniculaceus*, but alſo with *abrotanifolius* and *fiſoſus*. What have been taken for veſicles, on the moſt careful examination with good glaſſes, evidently appear to be congeries of ſeed-bearing tubercles: and this is farther confirmed by the irregularity of their ſhape; for, though they are generally oval, they vary conſiderably in their proportional length and thickneſs, and ſome of the terminal ones are frequently

frequently bifid, repreſenting in miniature the fruit-bearing terminations of *Fucus veſiculoſus*.

The figure of Gmelin is ſo accurate, though it repreſents a ſingle branch only, and not an entire plant, that it cannot be miſtaken; and his deſcription confirms our aſſertion of the want of air bladders, as he ſays, the veſicles conſiſt of a congeries of tubercles appearing to be full of ſeeds.

We have never obſerved the terminating ſubulate leaves to be wanting in the perfect plants, though in old ones they frequently are, being broken off by the force of the waves; we have therefore adopted this as part of the ſpecific character, to diſtinguiſh this ſpecies from *abrotanifolius*, which always has the branches terminated by a multipartite leaf with obtuſe ſegments. It is farther diſtinguiſhed from *abrotanifolius* by the want of veſicles, by being branched directly from the root, and by the branches and ſubdiviſions growing without order; in the latter alſo the veſicles and fructification are obſervable on the upper branches only, but in this the tubercles are to be found on all the ſmall ramifications. It is diſtinguiſhable from *fibroſus*, by its ſmaller ſize, its terminating fructification and want of veſicles; and from *fœniculaceus* and *concatenatus* of Linnæus, by its want of veſicles and its black colour when dried.

The quotation of Gmelin's accurate figure and deſcription of this plant in *Syſt. Nat.* and the erroneous ſynonyms given by Gmelin himſelf, are a ſufficient apology for Mr. Hudſon's ſuppoſing this plant the *fœniculaceus* of Linnæus; notwithſtanding the mention of veſicles in the ſpecific character, which are totally wanting in this ſpecies, might have led him to ſuſpect ſome error.

We have not deſcribed the root; the ſpecimens which have fallen under our obſervation not having any: but it is reaſonable to conclude, that both this ſpecies and *abrotanifolius* adhere to the rocks by

ſome ſort of callous expanſion, as we know that ſuch are the roots of their affinities *fœniculaceus* and *fibroſus*.

### 13. FUCUS ERICOIDES.

F. fronde filiformi ramoſiſſimâ, foliis ſubulatis, terminalibus confertis arctè imbricatis, baſi tuberculiferis. *Herb. Linn. Buddle, p.* 18. *n.* 2. 19. *n.* 2. 5. *Petiver, p.* 40. *n.* 3.

Fucus erica marina. *Gmelin, p.* 128. *t.* 11. *f.* 2.—non bona. *Linn. MSS.*

Fucus tamariſcifolius. *Fl. Ang.* 576. *Withering*, 3. *p.* 239.

*Habitat* in rupibus ſubmarinis in Inſulâ Portlandiâ—In com. Cornubiæ, Devoniæ, Eboraci.

*Radix* callus expanſus craſſus durus—*Frons* primo ortu dura lignoſa teres, at frequentius ramis vi fluctuum abruptis, ſuperficie inæquali. Haud mora ramoſa fit ramis omnibus densè ſtipatis—*Rami* longiuſculi in plurimos ramulos alternatim ſitos dividuntur. Hi ramuli folia plurima alterna ſubulata gerunt infernè remotiuſcula, ſupernè conferta arctè imbricata—Ad apicem ramulorum hæc folia baſi extus tubercula exhibent, minuta, rotunda, glaberrima, veſiculas referentia, quæ fructificationem præſtant—*Color* nigricans—*Altitudo* 3—9 uncialis.

*Obſ.* Tubercula ad baſin foliorum, foliis ipſis ſub-duplo ampliora.

Mr. Hudſon confounded our F. *ericoides* and *ſelaginoides* under the name *tamariſcifolius*, and, imagining them to be one and the ſame, framed his deſcription accordingly. We have ſpoken ſufficiently of *ſelaginoides* under that article. F. *ericoides* is conſtantly diſtinguiſhable by its numerous branches growing cloſe together in the manner of a ſhrub, and by its leaves alternate and ſomewhat re-

6 mote

mote from each other at the baſe of the branches, but cluſtered together at the ſummit. Theſe cluſtered leaves produce a ſmall veſicle or tubercle on the outſide of their baſe, not much larger than the leaf itſelf:—this proportion of the veſicle to the leaf ſhould be conſtantly attended to, as it is a very ſtriking mark of diſtinction from *ſelaginoides* in its moſt diſguiſed forms. The leaves at the ſummit, cluſtered together with the tubercles at their baſe, reſemble in ſome degree a bunch of grapes in miniature. The ſmall branches in this ſpecies grow ſomewhat zigzag.

Dr. Withering is the firſt who ſeparated *ſelaginoides* from *tamariſciſolius* of Hudſon. He gives us alſo Major Velley's remark upon the cærulean tints which are reflected from the branches. It always appeared to us a blue faint light, ſuch as is often obſervable on oyſter-ſhells, when the friction of the knife has touched upon a part loaded with nitrous particles. At times this light is very copious, and of courſe truly characteriſtic and ornamental: it is obſervable only when under water.

It adheres to rocks moſt ſtrongly; no *fucus* having a much ſtronger organ of adheſion, or a tougher ſubſtance.

### 14. Fucus granulatus.

F. fronde filiformi ramoſiſſimâ, debili; foliis ſubulatis, laxiuſculè imbricatis, baſi tuberculiferis; tuberculis contiguis.

*Sp. Pl.* 1629. *Fl. Dan.* 591.

Inter rejectamenta maris apud Yarmouth.

*Radix* ——. *Frons* ramoſiſſima pedalis et ultra debilis, effuſa, ramis alternis denuo confertiſſimis, foliis ſubulatis acutis brevibus, baſi ad dorſum tuberculiferis—*Tubercula* ſubrotunda, minuta con-

tigua ſubimbricata, per extremos ramulos conſita, baſi foliorum vix majora—*Subſtantia* cartilaginea—*Color* recentis olivaceus, ſiccatæ niger.

F. *granulatus*, *ericoides*, and *ſelaginoides*, approach ſo near to each other, that it requires the utmoſt attention to keep them ſeparate. —*Ericoides* is of low ſtature, erect like a little ſhrub, and very buſhy; and the tubercles are cluſtered at the ends of the ramuli like grapes. —*Granulatus* and *ſelaginoides* are of tall and more infirm growth. Of theſe, *ſelaginoides* has its tubercles ſolitary, and ſomewhat diſtant, at the baſe of the leaves of the extreme branches; but *granulatus* has them contiguous, and ſet cloſe all along the extreme branches, and even part of the greater branches. The leaves in all are ſubulate and acute, but vary in proportion to the ſize of the tubercle.—In *ſelaginoides* they are four times larger, in *ericoides* twice as large, and in *granulatus* not much larger. We have never ſeen it in a growing ſtate, but have found it along with *ericoides* and *ſelaginoides* waſhed on the ſhore at North Yarmouth.

The leaves in all theſe ſpecies are very liable to fall off; in this ſtate the fructification affords clear marks of diſtinction. F. *barbatus* alſo comes very near to *ericoides* when thus mutilated; but the branches are uſually dichotomous and always entire, whereas in *ericoides* they are very ramoſe, and bent in ſomewhat an angular or zigzag direction.

### 15. FUCUS SELAGINOIDES.

F. fronde filiformi flexuoſâ ramoſiſſimâ; foliis ſubulatis remotiuſculis; veſiculis foliorum ſuperiorum baſi innatis. *Herb. Linn. Buddle, p.* 19. *n.* 1. & *p.* 39. *n.* 5. Old ſpecimens.

Fucus

Fucus abies marina. *Gmelin, p.* 83. *t.* 2. A, *f.* 1.
*Linn. Syſt. Withering,* 3. *p.* 239.
Inter rejectamenta maris prope Weymouth, et apud Inſulam Portlandicam menſibus Junio et Julio.

*Radix* ——————. *Frons* ſub-lignoſa, dura, teres, erecta, ramoſiſſima—*Rami* in ramulos plurimos flexuoſos alternos abeunt—*Folia* omnia alterna, ſubulata, adſcendentia, ſinubus obtuſiuſculis, ſuperiora baſi extus tuberculo inflato ſ. veſiculâ flaveſcenti, muco plenâ, ſeminiferâ—Folia omnia remotiuſcula nec denſè ſtipata—Fructificatione abſoluta, ſ. veſiculis dilatatis, folia ad apicem ramorum contigua videntur—*Color* recentis plantæ luteſcens, ſiccatæ niger—Veſiculæ autem vel ſiccatæ ſæpiùs flaveſcentes—*Altitudo, ſeſquipedalis et ultra*, Gmelin.

*Obſ.* Veſiculæ ſ. tubercula ad baſin foliorum, foliis ipſis ſæpe pluſquam quadruplo ampliora.

We have never had the good fortune to ſee this plant in a ſtate of growth; only fragments thrown upon the ſhore have come to our hands. We can ſpeak therefore only of the upper parts of the frond; we give the height and the ſubſtance from Gmelin.

The account which Gmelin gives of its growth ſeems rather extraordinary. His words are—'The branches ariſing from the main 'ſtalk produce a footſtalk which bears an oblong veſicle; from this 'veſicle another footſtalk proceeds, and again this footſtalk is ſwelled 'with another veſicle, ſo that the branches make up a ſeries of pro-'liferous veſicles.' We have an idea that Gmelin's deſcription is applicable to the unfolding of the frond, rather than the growth itſelf; for the leaves at the baſe of the little branches are without any veſicle at all—then not unfrequently after the branch has proceeded to the production of a veſicle, a barren leaf or two intervenes

venes before another veſicle occurs; but this intervention deſtroys his law of vegetation. However, it muſt be allowed that the terminal leaves are all loaded with a veſicle at their baſe, which veſicles as they are enlarged become contiguous.

The ſlenderneſs of its habit, its lax appearance, the zigzag growth of the branches (occaſioned poſſibly by the protruſion of the leaves, which, after all, perhaps may be rather rudiments of branches than leaves, and thus occaſion ſuch revulſions), then the leaves being all alternate, adſcendent, and remote to a certain degree from each other, and at the end of the branches loaded with a veſicle at the baſe, many times larger and broader than the leaf itſelf, keep it ſufficiently diſtinct.

It appears to us that theſe leaves are in fact new branches, it being eaſy to trace thoſe at the baſe of the branches into ramification. At the top of the branches where theſe leaf-like rudiments cannot go into farther diviſion, there the veſicle is formed. Thus no part is uſeleſs; the plant is as much enlarged, and as fruitful, as the law of nature deſigned it.

### 16. FUCUS FOENICULACEUS.

F. fronde filiformi ramoſiſſimâ; ramis ſub-dichotomis; foliis ſubulatis æqualibus; veſiculis oblongis concatenatis innatis. *Herb. Linn. Petiver, p.* 34. *n.* 4, 5, 6. *Buddle, p.* 15. *n.* 2, 3. & *p.* 39. *n.* 3.

*Reaumur, Act. Gall.* 1712. *t.* 3. *f.* 5. *Linn. Sp. Pl.* 1629.

Fucus concatenatus. *Fl. Ang.* 574. *Fl. Scot.* 923. *Withering, vol.* 3. *p.* 237. *Velley, t.* 2. *f.* 1.

*Habitat* apud Weymouth Junio, Julio.

*Radix* callus craſſus vix expanſus—*Frons* ſpithamæa vel pedalis, teres

teres filiformis, ſtatim in ramos plurimos dividitur—Hi rami alios ramos ramuloſque ſimiles inordinatim ſitos protrudunt; ultimi veſiculas oblongas concatenatim diſpoſitas, parum diſtantes, ſæpè tuberculatas innatas habent, et foliis multipartitis ſubulatis terminantur; folia ſimilia in ramulis et in veſiculis ipſis frequenter occurrunt—*Fructificatio*, tubercula minutiſſima in foliis multipartitis terminalibus, et in ſeneſcentibus etiam in veſiculis ſita—*Color* brunneus vel ſubfuſcus.

In no part of the vegetable ſyſtem, has the introduction of the Linnæan Herbarium into England, and the free inſpection of it which the liberal poſſeſſor permits for the benefit of ſcience, been the means of detecting more errors than in the genus *Fucus*; and in no ſpecies of that genus is this more conſpicuous than in the preſent. Without this authority, it would hardly have been credited by the Britiſh botaniſt, that the plant deſcribed by Mr. Hudſon and the other Engliſh authors by the name of *Fucus concatenatus*, was in reality the *fœniculaceus* of Linnæus, than which nothing is more certain; and that the *concatenatus* of Linnæus, of which we have received ſpecimens from the Mediterranean exactly correſponding with that in the Herbarium, is a very different plant, and has not hitherto, as we believe, been found on the Britiſh coaſt.

This ſpecies is branched immediately from the root, and theſe branches generally proceed throughout, but are each of them again divided and ſubdivided, the ſmaller branches having numerous oval veſicles, nearly contiguous to each other, reſembling a chain, and terminated by a multipartite leaf, with ſubulate ſegments, which, when in fructification, are ſurrounded by minute tubercles. The veſicles are not always confined to the terminating branches, but

but are ſometimes obſerved on the others. In a young ſtate they are regularly formed and naked; but when the plant is more advanced, they frequently grow larger, are irregular in their ſhape, and are often in part covered with tubercles, ſimilar to thoſe on the terminating foliaceous ſegments.

The diſtinctions between this, *abrotanifolius*, and *barbatus*, are mentioned under thoſe ſpecies; but as it has been confounded with *concatenatus* of Linnæus, it may not be improper to point out in what they differ, notwithſtanding the deſcribing of the latter does not come within our preſent plan. In *fæniculaceus* the plant branches directly from the root; in *concatenatus* the principal ſtem is continued throughout—in the former the branches grow without order; in the latter they are more regularly oppoſite than in any other marine plant we have ſeen—the concatenated veſicles are larger and fewer in *fæniculaceus* than in *concatenatus*, and in the latter the veſicles are conſtantly naked, never having any tubercles upon them: the whole plant alſo, though perhaps longer, is much more ſlender, and more delicately formed in all its parts.

Whether *barbatus* Sp. Pl. *fæniculaceus* β Syſt. Nat. be the plant we have called *barbatus*, as from the reference to Gmelin might reaſonably be ſuppoſed, or whether it may be ſome varied appearance of this plant, it is impoſſible from the imperfection and uncertainty of the ſpecimens ſo named in the herbarium to aſcertain.

This plant is thrown up on the ſhore at Weymouth in May, June, and July, and but rarely after that time.

*Obſ.* Since this article was written, young ſpecimens of *fæniculaceus* and *concatenatus* have fallen under our obſervation; from which we are enabled to ſtate, that in both ſpecies the firſt branches are

in the form of linear leaves, which branch into others, and theſe contracting at intervals become veſicles, the ſubdiviſions forming the ſlender ramifications. Specimens of this appearance occur ſo rarely, that it was thought better not to alter the deſcription, which applies to the more general habit of the plant, as it might only tend to miſlead or confound the young botaniſt.

### 17. Fucus fibrosus.

F. fronde filiformi ramoſiſſimâ; ramis primariis ſub-diſtichis; foliis filiformibus linearibuſque; veſiculis ſub-rotundis innatis. *Buddle, p.* 18. *n.* 4, 5. *Petiver, p.* 40. *n.* 5. *Moriſon, Hiſt. Ox.* iii. *p.* 648. *t.* 8. *f.* 17. *R. Syn. p.* 49. *n.* 45.

Fucus abrotanoides. *Gmelin, p.* 89—baccatus, *p.* 90. *t.* 3. *f.* 2. *Fl. Ang. p.* 575. *Withering*, 3. 238.

Var. β ſetaceus. *Fl. Ang. p.* 575.

Foliis infimis ſub-linearibus, cæteris ſetaceis.

*Habitat* nullibi copioſiùs quam apud Ilfracombe in Devoniâ.

Inter rejectamenta maris prope Weymouth.

*Radix* callus expanſus—*Frons* ramoſiſſima, infernè ſub-compreſſa, ſcabra, dura, lignoſa—*Rami* primarii alterni diſtichi, baſi incraſſati; duri et lignoſi—Rami cæteri ramulique ſparſi alterni numeroſiſſimi, mox tenuiſſimi—Per hos ramos ramuloſque, veſiculæ ſubrotundæ, modo ſolitariæ, ſæpe concatenatæ videntur, omnes innatæ, glabræ, foliolo uno aut altero laterali breviſſimo ſubulato erecto armatæ—In plantis adultioribus, baſin verſus, folia linearia plana nervo medio tenui—In plantis adultioribus junioribuſque ſupernè folia omnia teretia, ſetacea aut ſub-ſubulata, longitudine multùm variantia; modo uncialia, modo breviſſima, pro habitu plantæ et ſtaturâ—Ramulorum foliola brevia admodum, baſi tumeſcentia, tuberculoſa—*Altitudo* pedalis

lis—3-pedalis—*Color* luteſcens ſ. ex flaveſcenti olivaceus; poſt exſiccationem niger.

*Obſ.* Folia omnia alterna, ante fructificationem longa ſunt, et in ramos ſtatim abeunt—Foliola tandem breviſſima, ſubulata, baſi tumida et tuberculoſa—Veſiculæ, utut ſeſe frondes quoad ætatem habeant, fortuito adſunt, aut, ſi fors tulerit, ut in β deſunt—In utroque caſu nihil fructificationis intereſt.

We have reaſon to think that there has been much confuſion made by different authors with reſpect to this plant. In the firſt place, the figure of Moriſon is given with a fibrous root, with which we may venture to aſſert this plant was never ſeen. In other reſpects it is very good.

In the next place, Gmelin appears to have ſeen this plant only in the two extreme ſtages of its growth: in its younger, when the upper leaves are all entire and ſetaceous, as he characteriſes it under the name F. *abrotanoides;* and in its oldeſt, when the finer leaves are all either for the moſt part broken off, or changed into branches; when alſo the veſicles are conſiderably enlarged. Not having ſeen the intermediate gradation of its progreſs, we cannot wonder that he deemed his F. *baccatus* a diſtinct ſpecies. We would hold out this inſtance, among many others we could name, as a warning to naturaliſts how they deſcribe from ſingle ſpecimens: they cannot be aware, and that more particularly in marine plants, of their true character from ſuch a ſlight acquaintance.

Mr. Hudſon having found different fragments of this plant, and concluding that they belonged to different ſpecies, called it in its finer and more delicate appearance *ſetaceus*, in its more diffuſe one *fibroſus*.

We found F. *fibroſus* growing in great plenty on the rocky ſhore near

near Ilfracombe. Few ſpecimens were more than a foot high; but we have ſeen it at Weymouth thrown up, after ſtorms, of great ſize, and well juſtifying Mr. Ray's apt compariſon to roots of trees.

In a recent ſtate it is of a yellow olive colour, but always turns black in drying. It is ſomething extraordinary, that ſometimes the bladders are wanting even in very old plants. The fructification is tubercles at the baſe of the ſhorter leaves, towards the end of the branches, ſomething in the manner of *tamariſcifolius*.

The F. *baccatus* of Gmelin is this plant in a very old ſtate, and may be found not uncommon, thrown up on the pebbly beaches of Dover, Haſtings, Weymouth, &c. The lower leaves are quite flat and broadiſh, and have a rib or nerve running up the middle.

We hardly know how to call Mr. Hudſon's *ſetaceus* a variety, and mark it ſo only by way of including that ſpecies. All the gradations from the firſt ſetaceous ſtate, to that in which Gmelin has figured it, are to be found conſtantly—the former when young or growing in ſhallow water near the ſhore; the latter when old and in deep water, not to be perceived in the extreme ebb of the tide.

In all ſtages of its growth, the lower leaves are more or leſs linear and flat, the upper ones filiform and ſetaceous. The bladders have uſually one or two ſhort ſubulate leaves growing upon their ſides.

*Obſ.* In general this plant has moſt numerous branches, and thoſe crowded together; but we have ſeen it thrown up on the coaſt with very few and thin branches, ſo as to be diſtinguiſhed only by perſons who have well known it in its various ſtages: but here alſo the branches and leaves are always alternate, and uſually diſtich. Theſe are young plants not yet in fructification. At the ferry at the Iſle of Portland, we found young dwarf plants, without bladders, with many branches tolerably cloſe, all

distich and alternate; and the main stems crowded with very small warty excrescencies. They were adhering to stones of a moderate size, sometimes loose.

### 18. FUCUS TETRAGONUS.

F. fronde simplici ensiformi basi rotundatâ; stipite alato quadrangulari.

Fucus fimbriatus. *Gmelin, p.* 200. *t.* 29. *f.* 1.

*Radix* fibrosa—*Stipes* infernè teres nudus, mox tetragonus membranâ latâ membranaceâ, basi rotundatâ ornatus—Anteaquam membrana incipit, foliola s. frondium novarum quasi rudimenta distichè proveniunt—Hæc foliola circiter 12 aut plura, conferta, subcartilaginea sunt et enervia, pro magnitudine plantæ minora, longiora, 2—6 uncialia et ultra.

### 19. FUCUS TERES.

F. fronde simplici ensiformi basi attenuatâ; stipite alato tereti compressiusculo.

Fucus alatus s. phasganoides. *Bauh. Pr. p.* 154.

Fucus esculentus. *Fl. Scot. p.* 938. *t.* 28.

Omnia quæ priori et huic accidunt, præterquam quod in hoc membrana basi attenuata in latius crescit, et quod *stipes* intra membranam ne minimè quidem tetragonus, at teres et compressiusculus. Porro foliola ad basin membranæ, membranacea sunt nec cartilaginea. *Frons* in utroque maxima, longissima, modo pedalis, sæpè ultra humanam altitudinem—At *tetragonus* longè major evadit.

We are in doubt to which of these species we should apply the term

term *eſculentus;* for Linnæus regarded them both as the ſame, and accordingly refers to the deſcriptions of both of them indifferently. However, there are ſo many differences obſervable in them that we have ventured to ſeparate them, and have named them from the leading mark of their diſtinction: the ſquareneſs or roundneſs of the rib or nerve when it becomes inveſted with the membrane.

In the firſt place, they are not found in the ſame place: the *tetragonus* is met with in the Iſle of Man, where *teres* does not make its appearance; *teres* is found in the Iſle of Angleſey, and in many places on the northern coaſts of England and Scotland both eaſt and weſt, where *tetragonus* has no place.

*Tetragonus* has a ſquare ſtalk or rib—*teres* a roundiſh one; *tetragonus* has the baſe of the frond rounded and ſub-cordate, as is expreſſed in Gmelin's figure—*teres* has it very much attenuated, as may be ſeen in Mr. Lightfoot's repreſentation. In *tetragonus* the little leaves at the baſe of the frond are thick and ſomewhat cartilagineous—in *teres* they are membranaceous. *Tetragonus* is found growing above the low-water mark—*teres* always juſt within the low-water mark. *Tetragonus* is by far the greater.

We are much indebted to our valuable friend the Rev. Mr. Davies, Rector of Aber near Bangor, for his appriſing us of the differences between theſe two ſpecies.

Gmelin with his uſual ſagacity ſuppoſed *tetragonus* to have a fibrous root; but his draftſman unfortunately has made it a ſolid one. There is an omiſſion alſo of the leaves at the baſe of the frond.

Mr. Lightfoot, who met only with *teres*, deſcribes it with a ſquare rib. He was led into this error moſt probably from examining only dried ſpecimens: in drying, the ſtalk becomes flat, and in that ſtate is not diſtinguiſhable from *tetragonus*.

Bauhin's

Bauhin's deſcription is very ſatisfactory.

Both ſpecies are eaten, as indeed are other *Fuci*.

*Tetragonus* is found on the rocks in the Iſle of Man; *teres* on the rocks out at ſea near Holyhead in the Iſle of Angleſey.

### 20. FUCUS ALATUS.

F. fronde membranaceâ tenerrimâ ramoſâ ſubdichotomâ. *Herb. Buddle, p.* 12. *n.* 2. 6. *Petiver, p.* 25. *n.* 4. *Gmelin, p.* 187. *t.* 25. *f.* 1, 2. *Fl. Dan. t.* 352. *R. Syn. p.* 44. *n.* 20. *Linn. Mant.* 135. *Fl. Ang. p.* 578. *Fl. Scot. p.* 951. *Withering, vol.* 3. *p.* 243.

*Habitat* in rupibus, ſaxis et tignis ſubmarinis paſſim.

*Radix* callus expanſus—*Caules* plurimi, omnes alati, ab eadem radice oriuntur, qui ſub ipſo ortu ramoſi fiunt, et ſæpius dichotomi—*Subſtantia* omnino tenera—*Ramuli* diſtichi alterni, et præ membranâ per totam plantam connexâ, decurrere videntur—Apices ipſi ramorum ramulorumque a tuberculis omnino immunes; variant integri et bifidi, obtuſi et acutiuſculi, pro ætate et loco —*Fructificatio*, tubercula parva rotunda apicem ramulorum verſus nervo adhærentia—*Color* omnino amœniſſimus, modo vireſcens nervo rubro, modo omnino ruber.

*Rami* variant latitudine $\frac{1}{4}$ lin.—$\frac{1}{2}$ unciales et ultra—*Altitudo* 1—5 uncialis.

Our ſpecific deſcription is fully ſufficient to diſtinguiſh this plant; for no other in this diviſion has a thin membranaceous pellucid ſubſtance. Its beauty makes the moſt incurious obſerver notice it.

21. Fucus

### 21. Fucus serratus.

F. fronde dichotomâ ſerrato-dentatâ, apicibus planis tuberculatis obtuſis. *Herb. Linn. Buddle, p.* 8. optima. *Petiver, p.* 28. *n.* 1. *Uvedale, vol.* 1. *p.* 2. *n.* 2. and *p.* 3. *Moriſon, Hiſt. Oxon.* iii. *f.* 15. *t.* 9. *f.* 1. *R. Syn. p.* 42. *n.* 7. *Act. Pariſ.* 1711. *pl.* 9, 10, *et* 1712 *partie* 2*de*, *pl.* 3. *f.* 1, 2, 3, 4, 5, 7. 9. *Linn. Sp. Pl.* 1626. *Syſt. Fl. Ang. p.* 576. *Fl. Scot.* 902. *Withering, vol.* 3. *p.* 241. *Stackhouſe, Ner. Brit. p.* 1. *t.* 1.

*Habitat* in rupibus et ſaxis ſubmarinis paſſim.

*Radix* callus expanſus, attamen nervi quidam ſupernè extant, quaſi ex fibris coadunatis conſtaret—*Frons* pedalis bipedalis, plana, alata, dichotoma, obtuſa, marginibus profundè argutèque ſerratis—Per totam paginam puncta prominula ſparſa—Apices obtuſi, eroſo-dentati plani, tuberculati, tuberculis plurimis confertis, prominulis —*Color* olivaceus—*Subſtantia* cartilaginea.

*Frons* variat ramoſa et ramoſiſſima; argutè et crenato-ſerrata; lata et anguſta, at ſemper ſerrata, apicibus obtuſis planis tuberculatis.

There can be no difficulty in determining this ſpecies, in whatever ſtage of its growth it may be found. The ſingularity of its root, having nerves or fibres ſtanding out above the ſurface of the *callus*, thus connecting the ſolid and fibrous rooted *Fuci*, the edges being conſtantly ſerrated, and the ends of the branches plain and not ſwelled, are marks by which a child may diſtinguiſh it. This ſpecies never has bladders.

The plate in *Act. Pariſ.* 1712, which we have referred to, ſhews the plant in all the ſtages of its growth.

Little points are obſervable on the membranous parts of all the branches. Nothing characteriſtic (as we have obſerved in our preface) can be drawn from them; for they are alike obſervable upon

upon its affinities *veſiculoſus*, *ſpiralis*, and *ceranoides*. Indeed theſe four ſpecies ſeem from their texture and habit to form a diſtinct family, although the artificial ſyſtem which we have adopted, neceſſarily includes others extremely diſſimilar in thoſe reſpects.

### 22. FUCUS VESICULOSUS.

F. fronde dichotomâ integerrimâ, veſiculis innatis axillaribuſque, apicibus tumidis tuberculatis acutiuſculis. *Herb. Buddle*, *p.* 4. *Petiver*, *p.* 32. *Uvedale*, *vol.* 1. *p.* 1. *n.* 1. & *p.* 5. *n.* 1, 2, 3. *R. Syn. p.* 40. *n.* 4. *Act. Pariſ.* 1772, *partie* 2*de*, *pl.* 3. *f.* 6. 10. 11, 12, 13.

Fucus Quercus marina. *Gm. p.* 60.

—— veſiculoſus. *Linn. Sp. Pl.* 1626. *Fl. Ang. p.* 576. *Fl. Scot. p.* 904. *Withering*, *vol.* 3. *p.* 241. *Stackhouſe*, *Ner. Brit. p.* 4. *t.* 2.

β. *Divaricatus*—veſiculis axillaribus dilatatis, axillis divaricatis. *Uvedale*, *vol.* 1. *p.* 4. *Mor. Hiſt. Oxon.* iii. 647. *f.* 15. *t.* 8. *f.* 5.

F. divaricatus. *Linn. Sp. Pl.* 1627. *Syſt. Fl. Scot. p.* 909.

F. veſiculoſus γ. *Fl. Ang. p.* 577. *Withering*, *vol.* 3. *p.* 242.

γ. *Inflatus*—fronde apicem verſus veſiculoſo-inflatâ. *Buddle*, *p.* 5. *n.* 2.

F. inflatus. *Fl. Scot. p.* 910. *Smith*, *Icones Plant. rar. faſc.* 3. *t.* 75.

δ. *Acutus*—fronde apicibus productis lanceolatis. *Buddle*, *p.* 4. *n.* 3.

ε. *Foliaceus*—ramis proliferis, ramulis obovatis. *Buddle*, *p.* 5. *n.* 4.

ζ. *Volubilis*—fronde contortuplicatâ. *Buddle*, *p.* 7. *n.* 4, 5.

F. volubilis. *Fl. Ang. p.* 577.

*Habitat* in rupibus et ſaxis ſubmarinis frequens. ζ prope Fambridge ferry, Eſſex. *Buddle.*—In Æſtuario Ciceſtrienſi. *Ray.*

*Radix* callus expanſus—*Frons* pedalis, bipedalis, plana, alata, dichotoma, marginibus integerrimis, ramis ſterilibus obtuſis—Per totam paginam puncta prominula ſparſa—*Apices* valde tumidi ovati acutiuſculi (in δ lanceolati acuti), tuberculati, tuberculis plurimis confertis prominulis—Per totam frondem *veſiculæ* duplici ſerie innatæ; quædam etiam ſolitariæ ad axillas—*Color* olivaceus—*Subſtantia* cartilaginea.

*Var.* β. Ramos ad dichotomias valde divaricatos habet, nimirum præ veſiculâ axillari dilatatâ, vel forſan præ duabus veſiculis coadunatis—Cætera ut in α.

*Var.* γ. Rami ex caſu quodam, ſive forſan morbo inflari videntur, quaſi hydropico.

*Var.* δ. Omnia habet ut *var.* α, præterquam quod apices lanceolati acuti, at in eâdem plantâ, nonnunquam apices hi lanceolati, illi ovati acutiuſculi.

*Var.* ε. Ramis vi fluctuum abruptis, quò injuriam reparare queat, ramulos plurimos confertos obovatos plerumque emittit, adeò ut vix varietas dici poteſt.

*Var.* ζ. Frons contorquetur adeò ut non facilè explicari poteſt—Cætera cum α habet communia.

The various authors who have written upon the *Fuci*, have very unwarrantably divided the varieties included in the denomination *veſiculoſus*, into numerous ſpecies; but nature has ſhewn the true limit: the appearance of bladders in the frond is its unerring characteriſtic. By this mark it becomes ſeparated from *ſerratus*, *ſpiralis*, and *ceranoides*—the ſize and ſituation of theſe bladders are not ſufficiently conſtant to conſtitute different ſpecies.

1. In the firſt variety the veſicles are ranged on each ſide of the rib throughout the frond, and alſo at the axillæ. The frond itſelf varies in having its branches from a quarter of an inch to a full inch in breadth, with edges either plane or undulated as in *ſpiralis*. The ends of the branches when in fructification are ſwollen and ſomewhat acute.

2. The variety *divaricatus* is remarkable for having the bladders in ſome of the axillæ (for it is by no means conſtant in all) extremely dilated, as if two veſicles had been confluent into one; in conſequence the branches fork off wider than uſual, and become divaricated. We have not obſerved this variety in fructification: in Southampton river we have ſeen it ſomewhat twiſted.

3. The variety *inflatus* is occaſioned by a diſeaſe. By ſome means or other a body of air is introduced between the two coats of the frond, and thus gives it a bladder-like appearance. That it is accidental is evident, from its not happening uſually in more than one or two branches in any given plant.

4. The variety *acutus* we ſo call from the lanceolate terminations of its branches. The ſame plant, however, occaſionally furniſhes lanceolate terminations, and others ſomewhat bluntiſh.

5. We can ſcarcely call *foliaceus* a variety; it is merely a plant which, in the vigour of its growth having been broken off by ſome violence, endeavours to repair itſelf in an irregular manner, producing cluſters of new branches reſembling obovate leaves. Theſe are principally from the broken extremities; but they are alſo found on the ſides, and even upon the expanded root. As in *ceranoides*, this proliferous tendency does not take place unleſs the membrane is torn off. It differs from the firſt variety in no other particular.

6. This is the *volubilis* of Mr. Hudſon. It cannot however be called a diſtinct ſpecies; for its form is the ſame nearly as the firſt, only

only it is extremely twiſted: however, the contortion of the frond in *Fuci* is no character of diſtinction, as occaſionally it is ſeen in all the varieties above mentioned. The *volubilis* of Linnæus is not a Britiſh plant.

He who would wiſh for farther information, would do well to conſult Gmelin, Lightfoot, and others, who have written largely upon the ſubject.

Its true and conſtant character is veſicles on the branches, and at the axillæ of the dichotomies.

The figure of Moriſon *f.* 15. *t.* 8. *f.* 10, as quoted by Gmelin to his $\alpha$, and by Hudſon to his variety $\beta$, belongs to that variety of *ſpiralis* which has plain and entire margins, and not to *veſiculoſus*. The ſynonyms of Gmelin are to be received with great caution: he has fallen into many miſtakes.

In *Buddle's Herbarium*, *p.* 7. *n.* 4, 5. are ſpecimens of *veſiculoſus* extremely twiſted. They are the *ſpiralis* or *volubilis* of Mr. Hudſon, not of Linnæus and Mr. Lightfoot. There is a note ſubjoined, mentioning, that they were gathered near Fambridge ferry in Eſſex. They are our laſt variety, if indeed any exact limit can be drawn between that and the firſt; for, as we have already obſerved, contortion ſeems accidental in this ſpecies.

### 23. Fucus spiralis.

F. fronde planâ dichotomâ æquali, apicibus tumidis tuberculatis obtuſis.

Var. $\alpha$. *undulatus*—ramis margine ſub-undulato, apicibus obtuſiſſimis. *Herb. Linn. Buddle*, *p.* 6. *n.* 2. *R. Syn. p.* 41. *n.* 5. *Fl. Dan. t.* 286. *Linn. Sp. Pl.* 1627. *Fl. Ang. p.* 577. *Fl. Scot. p.* 911. *Stackhouſe*, *Ner. Brit. p.* 10. *t.* 5.

Var. β. *integer*—ramis margine integerrimo, apicibus ovatis obtuſiuſculis. *Buddle, p.* 6. *n.* 1. *Donati Adriatic. p.* 34. *t.* 3. *Moriſon, Hiſt. Ox.* 3. *f.* 15. *t.* 8. *f.* 10.

F. ſpiralis γ. *Fl. Scot. p.* 912.

F. veſiculoſus β. *Fl. Aug. p.* 577. *Withering, vol.* 3. *p.* 242.

*Habitat* in rupibus et ſaxis marinis.

*Radix* callus expanſus—*Frons* 4-uncialis dodrantalis et ultra, alata, inferne ſæpius membranis orba—*Rami* in α latiores, marginibus undulatis, apicibuſque tumidis et obtuſis—in β anguſtiores, marginibus integerrimis, apicibuſque valdè tumidis ovatis, et nonnunquam acutiuſculis—*Habitus* F. veſiculoſi, at veſiculis omnino caret—Modo ſpiraliter contorta, modo omnino plana—*Color* olivaceus—*Subſtantia* membranacea.

Fucus *ſpiralis* has entirely the habit of F. *veſiculoſus*. It is however readily diſtinguiſhed from it by its being entirely free from bladders. If there ſhould be any danger of confounding it with F. *ceranoides*, that difficulty may be avoided by obſerving, that in *ſpiralis* the ends of the branches are very much ſwelled and obtuſe —and in *ceranoides*, they are but ſlightly tumid, and extremely acute.

Our firſt variety exactly acords with Linnæus's and Mr. Lightfoot's ſpecimens. The margins of the branches appear ſomewhat undulated. The lower parts of the plant are apt to loſe the membrane; neither does it uſually make any attempt to repair the injury, as *veſiculoſus* and *ceranoides* do: the ends of the branches are not ſo very tumid as in the var. β. The branches towards the top of the plant where the membrane is entire, are from $\frac{1}{8}$ to $\frac{2}{3}$ of an inch broad.

In our var. β, the branches have their margin entire. The membrane of the lower parts of the plant is alike torn off by the violence

violence of the waves: the branches, where entire, are uſually ſomething more than ¼ of an inch broad—the ends of them are much ſwelled, and not quite blunt. This variety gives much trouble in drying, owing to the great quantity of mucilage in the ends of the branches: when dry, the ends often appear more acute than they are in their freſh ſtate.

Ray mentions it as being very common near Chicheſter. We have found it frequently in ſeveral places on the ſouth coaſt.

We cannot help remarking upon the name of this plant. One would imagine that it was conſtantly and ſingularly ſpiral: that is by no means the caſe; for it is often found perfectly plain. All the varieties of *veſiculoſus* occaſionally affect a ſpiral growth: the diffuſe *divaricatus* is not exempt from it—ſo that the name is not excluſively applicable to this ſpecies. It is known moſt ſurely by its extremities being ſwelled and obtuſe, and being free from bladders. Theſe are its conſtant diſtinction: its ſpirality is accidental.

### 24. Fucus ceranoides.

F. fronde planâ dichotomâ integerrimâ æquali, apicibus tumidiuſculis tuberculatis lanceolatis. *Herb. Linn.* *Buddle*, *p.* 6. *n.* 3. *Buddle & Vernon*, *p.* 21. *n.* 4.

F. filiformis. *Gmelin*, *p.* 72. *t.* 1. A. *f.* 1.

F. ceranoides. *Linn. Sp. Pl.* 1626.

F. linearis. *Fl. Ang. p.* 578.

F. diſtichus. *Fl. Scot. p.* 912. *Withering*, *vol.* 3. *p.* 242.

*Habitat* in rupibus et ſaxis ſubmarinis prope Chriſtchurch in agro Hantonienſi.

*Radix*, callus parvus expanſus—*Frons* 3-uncialis—ſeſquipedalis, alata, anguſta, plana, dichotoma, veſicularum expers; ab ipſo ferè ortu

ortu ramosa sit, rami omnes multoties dichotomi, apicibus patentibus lanceolatis acutis—*Fructificatio*, tubercula conferta in ipsis apicibus sita.

*Obs.* *Frons* denuò infernè membranâ alatâ sæpius vi fluctuum orba est—Inde, quo injuriam citius, pro effœtis quasi viribus, reparare queat, ramulos plurimos, breves, distichos, foliorum æmulos, emittit—Margines ramorum per totam plantam semper integerrimi *Color* olivaceus.

This plant is not to be found so generally as most of this order. It is very frequent at Christchurch, and indeed more common there than *vesiculosus*. It is most readily distinguished from *vesiculosus* by its having no bladders, by its narrow form throughout, and by the sharp forked termination of its branches: these two last circumstances serve to distinguish it very effectually from F. *spiralis*. Although we lay some stress upon the narrowness of the branches, yet it must not be understood, that we are always to have that circumstance to direct our judgment; for sometimes it is to be met with, with branches as broad as the narrower ones of *vesiculosus*—and in this case oftentimes not only the points of the branches, but the two last dichotomies, are entirely loaded with clustered tubercles. The points of the branches are always very acute.

We have no hesitation in pronouncing this the *ceranoides* of Linnæus. We have been so long accustomed to call the *crispus* of Linn. by this name, that it may seem grievous to some to have so apt an appellation totally changed: however, they must consider that the having continued long in an error is no justification for having done so; and they should rejoice, not regret, at gaining more perfect knowledge.

This plant has been thought by some, particularly Mr. Lightfoot, to

to be the *diſtichus* of Linnæus. From examining the Linnæan Herbarium, and from Murray's deſcription of *diſtichus* in the *Syſt. Nat.* we are convinced that it is not a native of Britain. The *diſtichus* is quite thin and herbaceous—the *ceranoides* always membranaceous, and of a firm texture.

The branches have numerous ſmall dots in rows on each ſide of the rib or nerve, as happens in *ſerratus* and *veſiculoſus:* it varies in height from three inches to nearly, or perhaps quite, two feet.

As the plant grows old, it loſes the membrane of the whole lower part of the frond. In this caſe it has the property of putting forth new branches, which, growing cloſe to each other, and from their multitude not very large, give the plant a pretty fringed appearance. Before it has loſt the membrane, this proliferous quality does not make its appearance.

Mr. Lightfoot's deſcription mentions its being only a few inches in height. It is very probable that in certain ſituations, and eſpecially when remote from freſh water, it may be of more humble growth.

### 25. Fucus saccharinus.

F. fronde ſimplice enſiformi. *Herb. Buddle, p.* 21. *Petiver, vol.* 1. *p.* 15. *Act. Naturæ Curioſorum, vol.* 8. *p.* 450. *t.* 9. *f.* 2. *Gmelin, t.* 28.

Var. *β. bullatus*—fronde bullatâ marginibus undulatis. *Buddle, p.* 22. *Petiver, vol.* 1. *p.* 16. *Uvedale, vol.* 1. *p.* 14, 15. *Act. Pariſ.* 1712. *p.* 29. *t.* 3. *f.* 4. *Gmelin, t.* 27.

*Habitat* in rupibus et ſaxis ſubmarinis paſſim.

*Radix* fibroſa—*Frons* modo ſolitaria, modo gregaria; nempe aliquando

quando frondes plurimæ ſatis diſtinctæ (nam reverà quæque ſuâ radice nititur), at radicibus invicem implicatis, ex eodem loco oriuntur —Porrò frons ſtipitata—*Stipes* teres, magnitudine et altitudine pro ætate et loco variat—In junioribus fili inſtar tenuis breviſſimus; in adultioribus digiti ferè craſſitie, pedalis—Frons ipſa plana avenia enſiformis, pro ætate breviſſima aut longiſſima, anguſta aut lata, membranacea aut cartilaginea variat—*Color* ſordidè viret.

Var. *β*. *Radix et ſtipes* ut in *var.* *α*—*Frons* marginibus criſpis undulatis, et præterea ſæpe diſco rugoſo ſive bullato-ſinuoſo—Sinus muco repleti ſunt, et ſemina plurima nuda, ex Gmelini ſententiâ, muco obtecta ſ. recepta continent. Hæc ſemina nos non vidimus.

We have ſpoken ſufficiently of this ſpecies under our article *bulboſus*, particularly of the arrangement of theſe varieties.

The ſecond variety here deſcribed is ſuppoſed by Mr. Lightfoot to be the plant in its perfect or fructifying ſtate. As little is known of the fructification of ſea-plants, we rather for the convenience of deſcription place it laſt.

Reaumur obſerves, that he had found upon this ſpecies what he calls flowers (*fleurs compoſées de filets courts*) about ten or twelve on a plant, but no ſeeds.

### 26. FUCUS DIGITATUS.

F. fronde palmatâ laciniis enſiformibus; ſtipite tereti; radice fibroſâ. *Herb. Buddle, p.* 24. *n.* 1. *Petiver, p.* 18. *n.* 1.

Fuco giganteo. *Imp. Hiſt. Nat. p.* 741.

*Fl. Dan. t.* 392. *Fl. Norweg. par.* 1. *t.* 3. *f.* 1. *Fl. Ang. p.* 579. *Fl. Scot. p.* 935. *Withering, vol.* 3. *p.* 244. *Stackhouſe, Ner. Brit. p.* 5. *t.* 3.

*Habitat* in rupibus ſubmarinis frequens.

*Radix* ut in F. ſaccharino fibroſa—*Frons* ſtipitata—*Stipes* teres, uncialis, pedalis, bipedalis, tenuis, aut craſſus pro ætate et loco. Frons ipſa membranacea, cartilaginea, in lacinias enſiformes quatuor, ſæpe in plurimas dividitur, omnes planas avenias acutas—*Altitudo* in adultioribus, ulnaris et ultra—*Color* ſordidè viret—Fructificationem nondum vidimus.

### 27. Fucus bulbosus.

F. fronde palmatâ laciniis enſiformibus, ſtipite plano; radice inflato-bulboſâ. *Act. Pariſ.* 1712. *p.* 21. *t.* 1. *f.* 1.

F. palmatus. *Gmelin, p.* 202. *t.* 30.

F. bulboſus. *Fl. Ang. p.* 579.

F. polyſchides. *Fl. Scot. p.* 936. *Withering, vol.* 3. *p.* 244. *Stackhouſe, Ner. Brit. p.* 6. *t.* 4.

*Habitat* in Inſulâ Portlandiæ—in littore Cornubienſi.

Adhæret rupibus fibris, quæ ſingulæ in callum minutum expanſum deſinunt—*Frons* ſtipitata—*Stipes* planus, baſi inflato-bulboſâ (quæ radicem bulboſam cavam refert) tuberculoſâ, quaſi ex rudimentis frondium novarum, magnitudine ab ovo motacillæ uſque ad infantis caput, ſub-tortuoſus, marginibus infernè criſpo-undulatis, in adultis pedalis et ultra—Hic ſtipes in frondem abit planam aveniam, in lacinias plurimas diviſam, enſiformes acutas—*Color* ut in præcedentibus ſordidè viret—*Fructificatio* latet—An tubercula quæ ex ſtipitis baſi enaſcuntur, fructificationis receptacula? Videant autoptæ—*Altitudo* variat uſque ad quinque ulnas.

The F. *digitatus* and *bulboſus* ſeem extremely alike; but, to an attentive obſerver, no two plants can differ more. In F. *digitatus* the

ſtalk is round—in *bulboſus* perfectly flat: in *digitatus* it is ſimple throughout—in *bulboſus* it is inflated at the baſe, whence it reſembles a hollow bulbous root. This apparent bulb is covered with ſhort pezizi-form excreſcences, which authors have imagined to be rudiments of other plants. However, as this *fucus* is always found ſolitary, we would ſuggeſt the idea, that they may be receptacles of fructification. We rather dwell upon this idea, becauſe in the younger plants there is no appearance of tubercles. The ſtalk in *bulboſus* is ſometimes ſlightly twiſted, and juſt above the baſe has its margins thinniſh, and extremely curled or undulated: in *digitatus* the ſtalk is ſimple throughout; it has no inflation at the baſe, and is entirely free from all excreſcences whatſoever. The diviſions of the frond, except that they are rather more numerous in *bulboſus*, are in both alike, as to their ſword-like, or rather ſcymetar-like ſhape, and, according to their age, of a membranaceous, cartilaginous or leathery texture. The colour in both is a dirty green.

There is ſuch a ſimilarity in the habit, texture, and root of *ſaccharinus*, *digitatus*, and *bulboſus*, that we cannot but be ſtrongly inclined to think the fructification is alike in them all. They ſeem to form a ſeparate family. It was this idea which induced us chiefly to look upon the *bullated ſaccharinus* to be the variety, and the ſmooth one ſo like *bulboſus* and *digitatus*, to be the principal. All theſe ſpecies have mucus enough to conſtitute a receptacle for the ſeeds or fructification; ſo that that conſideration need not force us to have recourſe to the bullated variety of *ſaccharinus* to account for the ſource of propagation of that ſpecies. If there were bullated varieties of *digitatus* and *bulboſus*, we might in that caſe allow that the bullated variety was the perfect plant; but as that is not the caſe, and as in two of theſe ſpecies the fructification is latent in the ſmooth frond,

we have every reaſon to think that it is ſo in the ſmooth variety of *ſaccharinus*.

Specimens of F. *digitatus* have been gathered at Harwich with ſwellings on the lower part of ſome of the ſegments, and both *digitatus* and *bulboſus* have been obſerved in Cornwall with ſwellings on the upper part of the ſegments, as repreſented in *Fl. Dan.* Whether theſe ſwellings were mere inflations, or full of mucilage, was not obſerved; however, no ſeeds were obſerved in them. The ſame ſort of ſwellings appear in *ſaccharinus var.* α, but no ſeeds have been diſcovered. However, all this confirms us in our idea of the analogy between all theſe plants, and of the propriety of calling our *ſaccharinus var.* α the perfect plant, and *bullatus* the accidental variety. We are thus alſo more ſtrongly perſuaded to look upon the mucus contained in the ſinuoſities merely as the natural conſequence of ſuch cavities in an extremely mucilaginous plant.

Both theſe ſpecies grow to a vaſt ſize, from one to nearly five yards.

Meſſrs. Fougeroux de Bondaroy and Tillet, in their very ingenious treatiſe upon marine plants, *Act. Pariſ.* 1772, have confounded *digitatus* and *bulboſus* together, alleging that the *ſtipes* is both round and flat.

### 28. Fucus laceratus.

F. fronde membranaceâ tenerrimâ ramoſâ; ramis ramuliſque ſublinearibus apice obtuſis.

F. laceratus. *Gmelin*, 179. *t.* 21. *f.* 4.

F. endiviæfolius. *Fl. Scot. p.* 948. *t.* 32.

F. criſpatus. *Fl. Ang. p.* 580. *Withering*, *vol.* 3. *p.* 247.

*Var.* β papyraceus—ramis ramuliſque tenuioribus ſub-ſinuatis.

*Var.* γ laciniatus—ramis dilatatis palmatis, ramulis ſublinearibus. *Fl. Ang. p.* 579. *Fl. Scot. p.* 947. *Withering, vol.* 3. *p.* 245.

*Obſ.* Variant omnes marginibus criſpo-undulatis, laciniatis, integriſque.

*Habitant* α et γ in rupibus, ſaxis et plantis ſubmarinis ſatis frequentes—*Var.* β apud Ilfracombe in com. Damnonienſi.

Adhæret rupibus, ſaxis, plantiſve ſubmarinis callo minuto; proximè ſit ſurculoſa: ſurculi iterum, quà fors tulerit, fortiter adhærent, et novæ fiunt plantæ—Inde rarò ſimplex et ſolitaria; at quaſi frons reperet, et ſurculos confeſtim emitteret, numeroſa—Ab ipſo ortu, *frons* membranacea eſt, rubicunda, ſanguinea, tenerrima—Haud mora in ramos abit variè diviſos—*Rami* ramulique lineares, alterni, obtuſi—*Fructificatio*, tubercula rotundiuſcula feminibus, ut videtur, repleta, propter latera apiceſque ramorum ramulorumque ſita—*Altitudo* frondis 1—5 uncialis—Pro ætate et loco ramuli longiuſculi aut breves; lineares, aut figurâ quaſi nondum perfectâ, ovati, oblongi, pauciores ſive plurimi.

*Var.* β omnia cum *var.* α communia habet, at ab omni parte minor et tenuior—In ramulos plurimos ſæpius dividitur—Hi autem non rarò perbreves ſunt, adeo ut rami ſinuoſi potius quam ramoſi videntur—Omnia autem hæc ex ſolo natali oriuntur.

*Var.* γ ad omnem diviſuram frondis dilatatur—Inde diviſio in ramos plurimos fit, in palmæ modum extenſos—*Color, ſubſtantia, ramulorum forma, et fructificatio* eadem ac in *var.* α et β.

*Subſtantia* in omnibus plerumque tenerrima; eſt ubi firmior et durior occurrit. *Frondes* nonnullæ, quandò rupibus ſolitariæ enaſcuntur, ſtipite breviſſimo compreſſiuſculo nituntur.

We have not departed from Mr. Hudſon's arrangement of theſe plants,

plants without repeated examination of their ſeveral properties. The fructification is the ſame in all the varieties: the only difference to be ſtated is, the enlargement of the var. $\gamma$ at all its diviſions, and, at thoſe diviſions, the palmated form in which the branches ſeem to be produced. But this diviſion is by no means conſtant in any one plant which may be found; ſome of the branches being dilated and palmated, and others linear, as in the *var.* $\alpha$, in the ſelf-ſame plant.—This then deſtroys all ſpecific character taken from that circumſtance. This dilated variety oftentimes is ſomewhat dichotomous, but the branches are always more or leſs linear and obtuſe. The var. $\beta$ in ſome ſtages of its growth approaches very near to *dentatus;* but it is ſufficiently diſtinct by the branches being obtuſe. All theſe varieties have the edges of the branches perfectly entire, or moſt beautifully fringed as it were with rudiments of branches, too cloſely ſet for any one of them to arrive at any material ſize. Tubercles are ſometimes found in theſe little rudiments.

The var. $\beta$ grows in great abundance at Ilfracombe in the north of Devonſhire, where it creeps round the edges of the baſons in the rocks, and makes a beautiful appearance.

This *fucus* attaches itſelf not unfrequently to other *fuci* and the coarſer *confervæ*, and very commonly to the *corallina officinalis.* When it attaches itſelf to plants, it ſeems to cling round them, and ſoon totally inveſts them if they are of ſmall ſize.

When it grows ſingle on rocks, it appears to have a very ſhort and thickiſh compreſſed ſtem.

Its delicate texture and beautiful red colour catch the eye of the moſt incurious obſerver.

The fructification is tubercles, or warty cluſters of ſeeds, ſcattered along or rather juſt within the edges of the branches.

As-

As Linnæus has taken no notice of this plant (F. *corymbiferus* of Gmelin is his *criſtatus*), we neceſſarily recur to the name by which Gmelin originally ſet it forth.

### 29. FUCUS DENTATUS.

F. fronde membranaceâ tenerrimâ ramosâ alternatim pinnatifidâ; ramulis linearibus apice inciſis, lacinulis acutis. *Herb. Linn. Moriſon, Hiſt. Oxon.* iii. *ſ.* 15. *t.* 8. *f.* 5. bona.
*Linn. Syſt. Fl. Ang. p.* 582. *Fl. Scot. p.* 952. *Withering, vol.* 3, *p.* 248.

*Radix* callus—Sub ipſo ortu frons ramoſa fit—*Rami* alternatim pinnatifidi, ſinubus ramulorum obtuſiuſculis—*Ramuli* breves lineares, nonnunquam etiam pinnatifidi, apicibus ſemper ſ. in lacinulas plerumque acutas diviſis—*Subſtantia* membranacea tenera admodum et avenia—*Color* ruber—*Altitudo* 2—4 uncialis—*Fructificationem* nondum vidimus.

*Obſ.* Oculo bene armato, ramuli, præſertim ad ſinus ramulorum, ciliis breviſſimis obſiti videntur.

We have not admitted the ſynonym of Gmelin's *corymbiferus*, although adduced by the authority of Mr. Hudſon and Mr. Lightfoot. We have little doubt but that is the F. *criſtatus* of Linnæus. It certainly is not *dentatus*.—That is a large plant, growing a foot high or more: *dentatus* rarely exceeds five or ſix inches.

We lament extremely our utter inability to ſay one word about the fructification.

Moriſon's figure is excellent. There is no danger of confounding it with any of its affinities. Teh only one which at all approaches it is the *laceratus* var. *papyraceus*; but the ends of the branches in that variety are entire and obtuſe—in this divided, and

Linn. Trans. III. tab. 17. p. 159.

F. jubatus.

M.F.G. del.

F. gigastinus.

and the ſegments for the moſt part acute. As the plant increaſes in ſtature, the ſharp terminations of the branches grow broader, and appear ſomewhat truncated. In this ſtate they are preparing for a freſh diviſion, and each blunt ſegment becomes divided into two acute ones; and thus the increaſe of the plant is carried on.

The great point of diſtinction to be depended upon, is the ends of the branches being divided into acute ſegments. In Mr. Lightfoot's collection we ſaw ſeveral ſpecimens whoſe frond had at the baſe a faint nerve, exactly like what is obſerved in F. *alatus*. The nerve, however, in theſe ſoon terminates; but in ſome ſpecimens, with which our friend Mr. M'Leay has favoured us, a faint nerve appears to run through all the branches. They were gathered near John o'Groat's houſe in Caithneſsſhire.

This anomaly is apt to perplex the young botaniſt: the ſame irregularity is obſervable in F. *rubens*.

### 30. Fucus bifidus. Tab. 17. Fig. 1.

F. frondibus membranaceis dilatatis bifidis, ſegmentis divaricatis obtuſis; tuberculis marginalibus diſtantibus. *Fl. Ang. p.* 581. *Withering, vol.* 3, *p.* 247.

*Habitat* in rupibus et ſaxis marinis apud Cromer in Norfolciâ.

*Adhæret* ſaxis et lapillis radice fibroſâ—*Frondes* a radice plures, a tenui principio ſtatim lateſcentes; ſingulæ 1—2 unciales, membranaceæ, tenerrimæ, lætè rubræ, pro altitudine bis, 3—4 bifidæ, ſegmentis 1—3 lineas latis, ſub-divaricatis, unde cuneiformes apparent; terminationes plerumque obtuſæ, rarò acutiuſculæ—*Fructificatio*, tubercula ſphærica, parva admodum, atro-purpurea, rara, diſtantia, in ipſo margine frondis, ſeminibus minutiſſimis repleta.

This

This ſpecies, which does not appear to have been noticed by any author before Hudſon, approaches neareſt to young ſpecimens of our *laceratus β*. It apppears however to differ in its much more humble growth, and the more tender and delicate ſubſtance of the frond, which is perfectly entire at the margins, never having that jagged appearance obſervable on the margins of the other.

The diviſions are never palmated, but conſtantly dichotomous, often divaricated, and having the dichotomy ſometimes three and even four times repeated, when the frond riſes to two inches or more in height; although in the *Fl. Ang.* they are ſaid to be once or twice only.

The fructification, which ſeems to have been unknown to Mr. Hudſon, is very particular; conſiſting of ſmall tubercles partly immerſed in the very margin of the frond, whence they project ſomewhat more than half their diameter, always ſolitary, and conſiderably diſtant; ſo that there are ſeldom more than three or four on any one frond. The plant is of a pale purpliſh red, extremely thin and delicate; the tubercles dark purple, and when ripe turning almoſt black.

It adheres by ſmall fibres to the large maſſes and rough ſtones which form the ſhore at Cromer on the coaſt of Norfolk; and is not unfrequently waſhed up by the tide on the ſandy beach at Yarmouth, and other places to the ſouthward. We have met with it alſo at Ilfracombe.

### 31. FUCUS CILIATUS.

F. fronde ſub-membranaceâ ramoſâ, ramis lanceolatis acutis ciliatis, ciliis ſimplicibus brevibus. *Herb. Buddle, p.* 26. *n.* 4.

*R. Syn.*

*R. Syn. p.* 47. *n.* 33. *Petiver, p.* 19. *f.* 2, 3.
F. ciliatus. *Gmelin, p.* 176. *t.* 21. *f.* 1.
F. ligulatus. *Gmelin, p.* 178. *t.* 21. *f.* 3.
F. holoſetaceus. *Gmelin, p.* 177. *t.* 21. *f.* 2.
F. ciliatus. *Fl. Ang. p.* 580. *Fl. Scot. p.* 944. *Withering, vol.* 3. *p.* 246.
*Var.* β—ramis ſublinearibus. *Buddle, p.* 26. *n.* 1. *Fl. Scot. p.* 946.

*Habitant*—α in rupibus marinis paſſim—β rarius.

*Radix* callus minutus, ſurculos emittens, unde fibroſa videtur. *Frons* ſub-membranacea, rubeſcens, palmaris, vel ſemipedalis, ſtatim lateſcens et in ramos inter ſe ſimiles variè diſpoſitos diviſa—*Rami* lanceolati, plerumque dichotomi, apicibus acutis—Totius frondis margines ciliati, ciliis ſimplicibus brevibus patentibus—Frons matura incraſſatur et ſub-cartilaginea fit; dein utraque pagina ciliis numeroſis ſcabra, quorum plurima tuberculis globoſis ſeminiferis terminata; tubercula etiam in ciliis marginalibus, ſed rarius, occurrunt.

This ſpecies includes three of Gmelin: his *ciliatus*, *ligulatus*, and *holoſetaceus*. The frond is at firſt membranaceous, divided almoſt immediately from the root, the branches $\frac{1}{2}$ or $\frac{3}{4}$ of an inch broad, the margins fringed with numerous patent *cilia*. This is Gmelin's *ciliatus, t.* 21. *f.* 1. but this figure is not nearly ſo good as the others.

In ſome ſpecimens many *ligulæ* are interſperſed among the *cilia*, which are nothing more than young branches. This is the *ligulatus* of Gmelin, *f.* 3, which certainly is by no means to be conſidered as diſtinct.

When the plant is arrived at maturity it acquires a thicker ſub-

ſtance, and becomes almoſt cartilaginous; and in this ſtate each ſurface of the frond is frequently rough, with numerous round ſpines from half a line to a line in length, of which ſome are bifid. Some of theſe bear globular tubercles filled with ſeeds, and are certainly no other than the peduncles of theſe tubercles, though many of them are abortive. This is Gmelin's *holoſtaceus*, *t.* 2, though he does not appear to have ſeen the tubercles.

The marginal *cilia* are always ſimple; ſuch as appear otherwiſe being in fact *ligulæ*, about to form young branches; theſe ſometimes, but rarely, bear tubercles.

It adheres firmly to the rocks by its fibrous baſe, and when taken out of the water is generally of a pale fleſh colour, but, on being expoſed to the air, ſoon acquires a full red; but ſometimes it is found of a bright red colour whilſt in a growing ſtate.

The var. β which is deſcribed by Mr. Lightfoot, differs in being much narrower with almoſt linear branches. It is alſo more branched, and the branches are ſometimes deſtitute of *cilia* on their margins. We have found it along with α, but much more rarely.

### 32. FUCUS JUBATUS. TAB. 17. FIG. 2.

F. fronde membranaceâ ramosâ; ramis lanceolatis acutis, ciliatis, ciliis ramoſis.

*Habitat* in rupibus et ſaxis ſubmarinis apud Ilfracombe in agro Damnonienſi, copiosè—In Inſulâ Portlandiæ rarius.

*Adhæret* rupibus callo minuto—*Frons* a primo ortu ſurculoſa fit—quacunque ſurculi ſaxa attingunt radicem agunt, et inde novæ ſiunt plantæ, atque hæ confertæ—Porrò valde ramoſa fit—*Rami* alterni plani lanceolati—E marginibus ramorum cilia emittuntur numeroſiſſima, ramoſiſſima, linearia, ſæpè ſub-capillaria—*Subſtantia* membranacea—*Color* ruber—*Fructificationem* nondum vidimus, at haud

haud dubium eſt quin eadem ſit ac F. *ciliati*—Anne ab illo ſatis diſtinctus?

Whoever will be at the trouble of comparing ſpecimens of this Fucus with thoſe of *ciliatus* will find a very ſtriking ſimilarity: however, we diſtinguiſh this by its *cilia* being very ramoſe—in *ciliatus* they are ſimple and undivided. The *cilia* are often round—the root, the ſubſtance, the colour and habit are nearly alike in both.

We have not found this common. We gathered a ſingle ſpecimen at Weymouth, where the *ciliatus* is very common. But at Ilfracombe in Devonſhire, where this ſpecies is very frequent, we did not find one ſpecimen of *ciliatus*.

We have not ſeen it in fructification; moſt probably it is ſimilar in this reſpect to F. *ciliatus;* and it certainly is to be doubted whether it be abſolutely diſtinct from that ſpecies.

The figure *Fl. Dan.* 1066, which is moſt unaccountably referred to F. *pumilus Fl. Ang.* appears to be a repreſentation of this plant; but it is not ſufficiently exact to allow us to quote it as ſuch with certainty.

Where there is ſo much uncertainty concerning a ſubject, we wiſh to throw out every hint which occurs. Perhaps the ramoſity of the *cilia* in this plant is in conſequence of its not being exhauſted as to its ſtrength by the production of fructification, and thus the efforts of the plant are diverted in this channel.

### 33. Fucus palmatus.

F. fronde membranaceâ variè divisâ palmatâ. *Buddle, p.* 23. & *p.* 25. & *p.* 27. *n.* 3. *Petiver, p.* 19. *n.* 4. *Uvedale, vol.* 1. *p.* 2. *n.* 4. *Moriſon, Hiſt. Ox.* 646. *ſ.* 15. *t.* 8. *f.* 1.

Fucus dulcis. *Gmelin*, *p.* 189. *t.* 26.

*Fl. Ang.* 579. *Fl. Scot.* 933. *pl.* 27. *Withering*, *vol.* 3. *p.* 245.

*Habitat* in rupibus & ſaxis ſubmarinis paſſim.

*Radix* callus parvus expanſus—*Frons* ſubmembranacea, aliquando coriacea, plerumque tenuis membranacea—*Stipes* brevis admodum, haud mora in ramos variè diviſos abit: modo frons primaria brevis, indiviſa, obtuſa & cuneiformis eſt, modo dichotoma, modo elongata ramis lateralibus indiviſis dichotomiſque: at denique rami palmatim quodammodo dividuntur. Sæpe frons verè palmata eſt, etiam ſub ipſo ortu—*Fructificatio* etiam variis ludit imaginibus—Modo non *Fucum* ſed *Ulvam* diceres, quippe granulis ſolitariis numeroſiſſimis conſpergi videtur. In plantis coriaceis fructificationem Fuci licet detegere, tubercula ſcilicet in fronde innata, apice dehiſcentia —Hæc perrarò accidunt—*Magnitudo* biuncialis, pedalis & ultra—*Color* ruber.

Were not this plant extremely common, and not liable to be confounded with any other, we ſhould think it our duty to draw up an elaborate deſcription of it in all its various forms. Scarcely a plant in nature varies more: as the extremity of the branches uſually terminates in ſomething of a palmated form, the eſſential character is taken from that circumſtance. But it muſt be obſerved, that it often is very backward in appearing without diſguiſe: oftentimes the branches are lengthened out without any diviſion; ſometimes they are merely dichotomous. Sometimes the frond is proliferous, ſo as to lay claim to a place in our firſt diviſion, *foliis diſtinctis*.

The deſcription in the *Fl. Scotica* perfectly coincides with our own obſervations. At Weymouth and elſewhere we have found it of a perfectly coriaceous ſubſtance, as well as the thinneſt membrane.

brane. We obſerved only in theſe dwarf coriaceous ſpecimens the true fructification, which is tubercles immerſed in the frond, and projecting from it, and opening at the point. In one of our ſmalleſt ſpecimens, a largiſh tubercle appears ſtanding on the ſurface of the diſk, and not immerſed: but theſe tubercles are rarely to be obſerved. In general the plant ſhoots out to ſome length; in this ſtate it has only ſmall ſeeds like granules (the character of an *Ulva*) diſperſed over the whole frond, ſo that one would conclude it to be an *Ulva*.

May it not happen, that having fulfilled the purpoſe of its production, viz. the fructification, the growth of the plant accommodates itſelf to its juſt limits; but, failing in that, it runs out wild and irregular, ſportive and impatient of all controul?

### 34. Fucus rubens.

F. fronde ſubmembranaceâ dichotomâ; ramis proliferis linearibus, ramulis apice dilatatis bifidis, laciniis acutiuſculs. *Herb. Linn. Buddle, p.* 26. *n.* 5. *and p.* 27. *n.* 5. *Ginanni Op. Poſth. t.* 26. *f.* 61. *Buxbaum, cent.* 1. *t.* 60. *f.* 2.

Fucus rubens. *Linn. Sp. Pl.* 1630.

Fucus criſpus. *Fl. Ang. p.* 580.

Fucus prolifer. *Fl. Scot. p.* 949. *t.* 30. fig. optima. *Withering, vol.* 3. *p.* 246.

*Habitat* in rupibus, ſaxis, et plantis ſubmarinis frequens.

*Radix* callus expanſus--*Frons* ab ipſo ortu ſæpius ramoſiſſima fit, nonnunquam ſimplex oritur, at in omnibus haud mora dichotoma eſt—*Rami* plani ſub-enervii lineares, ſubinde proliferi—*Ramuli* demum dilatati bifidique, et in lacinias ſ. lobos acutos deſinunt. Aliquando frons videtur ſtipitata ſtipite brevi teretiuſculo cartilagineo.

—Rami

—Rami ramulique proceſſubus ſub lente foliaceis notabiles—*Subſtantia* ſub-membranacea—*Color* ſanguineus—*Altitudo* 3—6uncialis.

Mr. Lightfoot has given ſuch an admirable deſcription of this Fucus, that it is needleſs to add to it.

He mentions that it has no rib or nerve; but it is no uncommon thing to find plants in their advanced ſtate with a manifeſt appearance of a nerve running up the centre of the larger or thicker branches.

Its proliferous production of new branches diſtinguiſhes it at firſt ſight from every other Fucus, which has the leaſt affinity to it.

The nerve which we have ſpoken of as viſible in the branches, is diſcovered by holding the plant before a very ſtrong light. Indeed this is the beſt mode of examining *Fuci* in general: the fructification and *original* colour of any plant, be it to outward appearance from drying what it will, are moſt ſurely detected by this method. When a plant has been once bleached by its expoſure to wind and weather, no art can reſtore its colour or diſcover it.

As we are certain that this is the F. *rubens* of Linnæus, the names of Mr. Hudſon and Mr. Lightfoot are neceſſarily ſuperſeded.

It is a matter of curious enquiry, whether the proliferous tendency of this plant be its natural growth, or whether it be its natural power of repairing any injury (to which its tender and brittle quality expoſes it at all times) which it may have received. We have found entire plants bearing no proliferous diviſion at all.

What appear to be tubercles upon this plant are in reality rudiments of branches. Our ſpecimens do not enable us to pronounce whether they produce ſeeds, or whether they are calculated to ſeparate from their parent plant, and thus taking root, to carry on the progeny.

35. Fucus

### 35. Fucus pinnatifidus.

F. fronde cartilagineâ ramoſâ; ramis patentibus ſub-duplicato-pinnatifidis, ramulis obtuſis calloſis. *Herb. Buddle, p.* 18. *n.* 7, 8. *Petiver, p.* 25. *n.* 1, 2. *Uvedale, p.* 12. *n.* 4. *Act. Pariſ.* 1712. *p.* 34. *t.* 4. *f.* 6. *Mor. Hiſt. Oxon.* iii. *p.* 646. *ſ.* 15. *t.* 8. *f.* 2.

Fucus Oſmunda. *Gmelin, p.* 155. *t.* 16. *f.* 2.

F. pinnatifidus. *Gmelin, p.* 156. *t.* 16. *f.* 3.

F. pinnatifidus. *Fl. Ang. p.* 581. *Fl. Scot. p.* 953. *Withering, vol.* 3. *p.* 247.

F. multifidus. *Fl. Ang. p.* 581. *Withering, vol.* 3. *p.* 248.

F. filicinus. *Fl. Scot. p.* 954.

*Habitat* in rupibus et ſaxis marinis frequens.

*Radix* callus expanſus ex quo cauliculi plurimi conferti oriuntur —*Frons* cartilaginea plana avenia ramoſior, ramis et ramulis diſtichis oppoſitis alterniſque—*Ramuli* breves, modo truncati, ſæpius apice obtuſo rotundato, et præ tuberculis innatis, ut videtur, calloſo. *Rami* pro habitu et loco, pinnatifidi, 2—3plicato-pinnatifidi et multifidi—*Altitudo* 1—5uncialis—*Subſtantia* ſub-cartilaginea—*Color* variat flaveſcens, olivaceus, et ex olivaceo ruber—*Fructificatio* tuberculæ ad ramulorum apices.

Fucus *pinnatifidus* varies very much with reſpect to the diviſion of its frond. Hence botaniſts have imagined it to contain different ſpecies, and have been at no ſmall pains to aſcertain their reſpective limits. As it happens to be a very common plant, frequent have been our opportunities of obſerving it. After very careful and repeated examinations, we can venture to pronounce that the *pinnatifidus* and *multifidus* of Hudſon and the *pinnatifidus* and *filicinus* of Lightfoot

Lightfoot are one and the ſame plant. This will be readily allowed by any one who will take up a cluſter of theſe plants when growing near the low-water mark at a ſpring tide. In almoſt every ſuch cluſter he will find all the gradations of diviſion to which we allude. F. *Oſmunda* ſhews it when of free growth in a young ſtate. Mr. Lightfoot remarks (but it proves his ſlight acquaintance with it), that it (his *filicinus*) never produces ſeeds—How ſhould it in this immature ſtate? Moriſon's figure exhibits it in full and perfect growth. This is an excellent repreſentation; but we have found it ſtill more luxuriant on the rocks near Ilfracombe.

There is ſcarcely any poſſibility of aſcertaining the cauſe of luxurious growth in any of the cryptogamic plants, be they *muſci*, *algæ*, or *fungi*. The plants of our very gardens vary in ſtature and monſtroſity, though cultivated with the ſame means and preciſely the ſame care. How much more then may we imagine ſubmarine plants to give into irregularities, whoſe occult ſituation and expoſure to unſeen currents baffle the moſt acute reſearches! On the ſame root may be found plants of a ſimple frond barely dentated; compound plants with a ſimple pinnatifid diviſion; and others with ramifications of a multiplied nature. The colour ſometimes is yellowiſh or buff, in its more advanced ſtate of a dark dirty red. The terminations of the ſmaller branches are loaded with minute tubercles; this gives them a callous appearance. Theſe tubercles extend themſelves not unfrequently a little way down the branches, and are ſometimes ſupported on ſhort thick peduncles.

### 36. Fucus crispus.

F. fronde ſub-membranaceâ dichotomâ; ramis integris; tuberculis ſolitariis ſparſis. *Linn. Syſt. Nat. p.* 970.

F. ceranoides α, β, δ. *Fl. Ang. p.* 582. α, β. *Fl. Scot. p.* 913. 915. α, β, δ. *Withering, vol.* 3. *p.* 249.

*Var.* α brunneus—membranaceus, ramis dilatatis criſpo-undulatis, laciniis obtuſiuſculis. *Herb. Linn. Buddle, p.* 10. *n.* 8.

F. ceranoides. *Gmelin, t.* 7. *f.* 1.

*Var.* β virens—membranaceus, ramis dilatatis planiuſculis, laciniis acutis longiuſculis. *Petiver, p.* 20. *n.* 3, 4.

*Var.* γ ſtellatus—ſub-membranaceus, ramis dilatatis apice criſpo-undulatis, laciniis numeroſiſſimis confertis breviuſculis. *Herb. Linn. Buddle, p.* 10. *n.* 5, 6.

*Var.* δ æqualis—membranaceus, ramis omnibus æqualibus linearibus planis, laciniis obtuſis.

*Var.* ε compreſſus—ſub-cartilagineus, inferne ſub-compreſſus, ramis ſub-linearibus planis, laciniis elongatiuſculis acutis. *Buddle, p.* 9. *n.* 2. *and p.* 10. *n.* 1, 2, 3. *Petiver, p.* 20. *n.* 5.

F. ceranoides. *Gmelin, t.* 7. *f.* 3.

F. filiformis. *Fl. Ang. p.* 585?

*Radix*, callus expanſus—Ex callo conſurgunt frondes plurimæ, 2—6unciales, omnes, præterquam in var ε, planæ aveniæ; in var. α, β, γ, ſenſim dilatatæ, dichotomæ—*Fructificatio*, tubercula diſco frondis, interdum marginibus innata, ovata, ſæpè rotundiuſcula, rubra—*Color* variat ruber, brunneus, virens, pallidûs.

Var. α plerumque brunnei coloris eſt—Extremitates ramorum criſpo-undulatæ—laciniæ obtuſiuſculæ—variant autem acutiuſculæ—Nullibi frequentius quam apud Ilfracombe enaſcitur.

*Var.* β plerumque viret—Extremitates ramorum ſubcriſpo-undulatæ—laciniæ longiuſculæ et ſæpiùs acutæ—*Habitat* paſſim.

*Var.* γ mirè in lacinias numeroſiſſimas confertas dividitur—Videtur potiùs naturæ luſus quam quæ vel varietas dici poſſit—Inter paulò rariores.

*Var.* δ ramos omnes æquales ſub-lineares laciniis obtuſis exhibet—Anguli dichotomiarum obtuſiuſculi—*Color*, ruber—*Habitat* in Inſulâ Portlandicâ, ſed rariùs.

*Var.* ε haud rarò ad altitudinem octo unciarum creſcit—*Frons* cartilaginea, ad baſin ſæpiùs compreſſa quam plana, ſed rami omnes demum plani aut ſaltem planiuſculi evadunt—*Rami* valdè tenues, lineares, æquales, laciniis longis acutis—*Fructificatio* in omnibus hiſce varietatibus eadem—*Habitat* paſſim.

No plant can well be ſuppoſed to vary more than this. If we view the extremities of its variation, the one will be found with a broad dilated membranaceous frond—the other with a narrow linear cartilaginous compreſſed one. Nevertheleſs the tranſition from the one to the other is ſo gradual, that it is not eaſy to be perceived where any difference takes place—

*Uſque adeò quod tangit idem eſt—*

It comes in competition with none of the *Fuci* which are arranged in this order, except the young ſpecimens of F. *rubens;* but the ſlighteſt attention will diſtinguiſh it from this. In the firſt place, this plant is never in any degree proliferous; and in the next, its fructification is ſmooth tubercles imbedded almoſt or entirely in the ſubſtance of the frond, not what Mr. Lightfoot calls warts, which when magnified appear to be the curled rudiments of young leaves. See F. *prolifer. Fl. Scot. p.* 951.

To ſtate all the varieties of this Proteus would be an endleſs taſk: we have only endeavoured to give an outline of the principal ones, to which the reſt may more readily be reduced.

There is prodigious confuſion in all modern authors about this *Fucus*. Having all of them taken it for granted that it is the *Ceranoides* of Linnæus, they have brought together a ſtrange maſs of plants, no one agreeing with the Linnæan deſcription, or conſiſtent with its brethren. One could ſcarcely imagine that ſuch eminent writers as Gmelin and Mr. Lightfoot would have joined *criſpus*, *mammilloſus*, *palmetta*, and *membranifolius*, as one and the ſame plant, or that Mr. Hudſon ſhould have ſeen a ſimilarity in thoſe above mentioned, adding alſo that variety of *veſiculoſus* which we call *inflatus*.

Our firſt variety ſtands in the Linnæan herbarium marked *criſpus*, and it agrees with Linnæus's deſcription. We have traced it regularly through thoſe varieties which we have deſcribed, and can pronounce that they all proceed from the ſame origin.

We call our third variety (which is alſo in the Linnæan herbarium along with the firſt) *ſtellatus*, after Mr. Lightfoot; but we have reaſon to think from the ſynonyms in Buddle's hort. ſiccus, that our laſt variety was meant by the deſcription F. *ceranoides albidas ramuloram apicibus ſtellatis*. *R. Syn. p.* 44.

The fourth variety has all its branches of the ſame breadth throughout, and the points are all obtuſe.

The fifth variety ſeems at firſt ſight ſcarcely to belong to this ſpecies; but to an attentive obſerver ſufficient proof will ariſe, it being no difficult matter to trace the gradations from the firſt variety down to this. We have little doubt but that Mr. Hudſon named this variety *filiformis*; and, from its compreſſed form, claſſed it in his diviſion *Fronde compreſſâ*. If this be not Mr. Hudſon's *filiformis*, we muſt profeſs ourſelves ignorant of it altogether,

having never met with any thing which correſponds with his deſcription.

The conſtant diſtinction of this plant is the dichotomous frond, and the ſmooth veſicle-like tubercles, placed irregularly towards the ſummits of the frond.

### 37. FUCUS CANALICULATUS.

F. fronde dichotomâ lineari, apicibus obtuſis tuberculoſis. *Herb. Linn. Petiver, p.* 31. *n.* 2, 3. 9. *Act. Pariſ.* 1711. *pl.* 11. *f.* 5. radicem fructificationemque exhibet. *Fl. Dan. t.* 214. optima. *Gmelin, p.* 73. *t.* 1. A. *f.* 2. *Moriſon, Hiſt. Oxon. 3. p.* 647. *f.* 15. *t.* 8. *f.* 12.

F. exciſus. *Linn. Sp. Pl.* 1627.—Canaliculatus. *Syſt. Fl. Ang. p.* 583. *Fl. Scot. p.* 917. *Withering, vol.* 3, *p.* 250.

*Habitat* in rupibus et ſaxis ſubmarinis.

*Radix* callus expanſus—*Frons* ſub ipſo ortu ramoſa—*Rami* modo nati ſæpe rupibus adhærent et novæ fiunt plantæ, unde plurimæ frondes ex eodem callo oriri viſæ ſunt—*Frons* omnino dichotoma canaliculata evadit—Apices ramorum obtuſi, tumidi, tuberculoſi—*Altitudo* 2—5uncialis—*Color* ex flaveſcenti olivaceus—*Subſtantia* cartilaginea—*Fructificatio*, tubercula conferta apices ramorum occupantia.

*Obſ.* Rami non reverà canaliculati, at marginibus longitudinaliter hinc contractis ſ. inflexis, ſpeciem canaliculorum præ ſe ferunt.

The order we here eſtabliſh is perfectly diſtinct. It agrees with the order *Fronde planâ aveniâ* in having no nerve, but differs from it in being channelled on one ſide, and not flat or plain. This appearance ariſes not from any canaliculation or groove being made in the

the ſolid ſubſtance of the plant, but rather from the margins being contracted as it were, and drawn through their whole length to one ſide—ſo that it has the appearance of being channelled rather than the reality. However, as the appearance is conſtant, we are glad, in arranging ſo numerous a family, to take advantage of it, and eſtabliſh a new order founded upon this circumſtance.

This plant is found on all rocky ſhores. Where it is expoſed to freſh water, the points of the branches, as well as the branches themſelves, are longer and coarſer, and the tubercles more numerous, and conſequently appear to be more tumid. We obſerved this particularly in the river Severn.

### 38. Fucus patens.

F. fronde dichotomâ lineari apicibus obtuſiuſculis planis; tuberculis ſubgloboſis ſparſis.

*Habitat* prope Marazion in littore Cornubienſi, et apud Ilfracombe in com. Devon. frequens.

*Radix* callus—*Frons* baſi ipsâ furculoſa, unde plurimi caules conferti enaſcuntur—*Frons* linearis, et hinc leviter canaliculata—*Rami* omnes dichotomi, dichotomiis patentibus—Apices ramorum plani, tuberculorum immunes, obtuſiuſculi—*Altitudo* variat 2—6uncialis —*Color* plerumque brunneus—*Subſtantia* membranacea—*Fructificatio*, tubercula ſubgloboſa prominula per extremos ramos ſparſa.

*Obſ. Habitus* F. *criſpi var. æqualis*, at margines ramorum longitudinaliter leviùs inflexi, unde canaliculati videntur rami nec plani.

Hitherto we have noticed this plant only at Ilfracombe in Devonſhire, and near Marazion in Cornwall. Some care is neceſſary to avoid confounding it with ſome of the varieties of F. *criſpus*. The leading mark

mark of diſtinction is that appearance of being channelled, which, though but ſlightly impreſſed, yet is ſufficiently viſible, particularly towards the baſe of the frond. The branches are patent, the dichotomies forming ſometimes almoſt right angles. We have perceived in ſome ſpecimens, when dried, a very ſtrong, rank ſmell.

### 39. FUCUS MAMMILLOSUS.

F. fronde dichotomâ ramis ſupernè dilatatis, utrinque mammilloſo-tuberculiferis, apicibus acutis. *Herb. Buddle, p.* 10. *n.* 7. 9, 10. *Moriſon, Hiſt. Ox.* 3. *p.* 646. *ſ.* 15. *t.* 8. *f.* 13. bona.

F. canaliculatus *var.* β. *Fl. Ang. p.* 583.

——————— *var.* γ. *Withering, vol.* 3. *p.* 250.

F ceranoides *var.* ε. *Fl. Scot. p.* 917.

*Var.* β—fronde anguſtâ lineari apicibus acutiuſculis.

F. ceranoides *var.* ζ. *Fl. Scot. p.* 916.

*Habitat* in rupibus et ſaxis ſubmarinis frequens—β prope Haſtings, ſed parcè.

*Radix* callus expanſus—*Frons* baſi ſurculoſa, unde plurimi caules conferti ex eodem callo oriuntur—Haud mora dichotoma fit; ante unamquamque dichotomiam dilatatio accidit, unde rami ramulique quodammodo cuneiformes videntur—Apices bifidi; laciniis acutis—*Frons* infernè anguſta canaliculata ut in præcedentibus, ſupernè rami lati et ſæpius plani—Per totam paginam utrinque mammillæ ſub-pedunculatæ ſparguntur—Hæ mammillæ modo ſteriles et quaſi rudimenta novarum frondium, modo tuberculiferæ, omnes incurvæ—*Subſtantia* membranacea firma—*Color* variat rubens, brunneus—*Altitudo* 2—5uncialis.

*Var.* β omnia fere quæ *var.* α habet—At frons anguſta admodum, et linearis—Mammillæ rarius proveniunt, et apices ramorum obtuſiuſculi.

The

The errors which have attended the inveſtigation of this plant, are owing in a great meaſure to Linnæus himſelf, who inadvertently under his *ceranoides* quoted the figure of Moriſon above mentioned. The figure altogether militates againſt the deſcription which he gives of *ceranoides;* for he deſcribes it as having *apices veſiculoſos*, which *mammilloſus* never has: beſides, the ſpecimen preſerved in his herbarium has no affinity to it; for that is never found with thoſe excreſcences which we mention as the characteriſtic of this plant.

Linnæus's quoting this figure of Moriſon to his *ceranoides*, led ſubſequent authors, who naturally truſted more to ſuch an expreſſive figure than to his verbal deſcription, to miſtake the plant which he named *ceranoides.* Thus Gmelin ſuppoſed *criſpus* to be *ceranoides*, and *mammilloſus*, inaſmuch as it was ſo cited by Linnæus himſelf, a variety of it.

Mr. Hudſon obſerving the frond to be channelled, referred *mammilloſus* to *canaliculatus;* but they differ moſt widely, the ends of the branches in one being exceedingly tuberculated, and the other plain. So that we cannot but wonder at ſuch a want of accuracy.

Mr. Lightfoot again carries it back to *ceranoides* in defiance of the wide difference of the very fructification, of which he ſeems perfectly aware. He does not ſeem to have noticed the frond being channelled.

When the learned in the ſcience ſo differ, we muſt deprecate all cenſure upon our vanity, if we preſume to hold out a truer inveſtigation. It cannot be *ceranoides* of Linnæus or *canaliculatus*, for the ends of the branches in both thoſe ſpecies are full of tubercles—in this, plain. It cannot be *criſpus*, becauſe the frond is plain and the tubercles are ſolitary and fixed in the ſubſtance of the plant; in this the frond is always channelled, and the fructification is minute tubercles in the mammilloſe proceſſes ſtanding out on each ſide of the ſeveral branches.

It will always be diſtinguiſhed by its dilated branches with acute points, even when not in a ſtate of fructification. The breadth of the branches varies from a line to half an inch. The colour is ſometimes of a fine bright red—moſt commonly of a dark red brown. The plant varies in height from two to five inches.

In our *var.* β the branches it is true are very numerous, but not more ſo (notwithſtanding Mr. Lightfoot aſſerts otherwiſe) than in *var.* α. The whole frond is about four inches high; the branches are all nearly of an equal breadth, from $\frac{1}{2}$ a line to $\frac{1}{8}$ of an inch. The dilatation of the frond takes place in this alſo; but from the extreme narrowneſs of the branches, it is diſcernible only by attentive obſervation.

### 40. FUCUS LOREUS.

F. fronde dichotomâ acutâ glabrâ utrinque tuberculatâ. *Herb. Linn. Buddle, p.* 20. *Petiver, p.* 35. *n.* 1. *Uvedale, app. p.* 87. *R. Syn. p.* 43. *n.* 11 *and* 15. *Ger. em. p.* 1568. *f.* 5. *Act. Gall.* 1712. *p.* 24. *pl.* 1. *f.* 2. ubi cum floribus ſeminibuſque depingitur. *Act. Gall.* 1772. *partie* 2. *pl.* 3. *f.* 14. *y. Fl. Dan. t.* 710. *Gent. Mag.* 1756. *p.* 64.

F. elongatus. *Linn. Sp. Pl.* 1627. Syn. *Mor.* excluſo.

F. loreus. *Linn. Syſt. Nat. Fl. Ang. p.* 583. *Fl. Scot. p.* 920. *Withering, vol.* 3. *p.* 250.

*Var.* β inæqualis—fronde planâ latiore inæquali, angulis dichotomiæ obtuſioribus. *Act. Gall.* 1772. *partie* 2. *pl.* 4. *f.* 18.

*Habitat*—α in Inſulâ Portlandicâ, et in littore auſtrali frequens. β inter rejectamenta maris apud Yarmouth in Norfolciâ legimus.

*Adhæret* fortiter rupibus callo explanato unciali—*Stipes* teres, uncialis, craſſitie pennæ cygnanæ, dein in diſcum concavum peziæformem

formem uncialem vel ſeſquiuncialem dilatatur—*Frons* una alterave, nonnunquam etiam plurimæ e diſci ſtipitis dilatati centro, tres vel quatuor lineas latæ, craſſæ, compreſſæ, coriaceæ, glabræ, modò ad ipſam originem, modò poſt paululum progreſſûs dichotomæ—*Rami* iterum iterumque dichotomi, dein frons ſingula ad duarum vel trium ulnarum longitudinem extenſa, et in pluſquam viginti ſegmenta acutè terminata diviſa—*Fructificatio*, tubercula numeroſiſſima per totam frondem utrinque ſparſa, apice perforata, et ſeminibus repleta—*Color* recentis plantæ olivaceus, ſiccatæ niger.

*Var.* β—fructificationem, ſubſtantiam et colorem ut in α exhibet—Sed *Frons* omnino plana et latior, latitudine admodum varians—Anguli dichotomiæ, qui in α acuti, in hâc varietate obtuſiſſimi et quaſi rotundati ſunt.

This ſpecies is ſo ſingular in its form and mode of growth, that it is impoſſible to confound it with any other in the genus.

At the firſt appearance it exactly reſembles a Peziza ſtanding on a ſhort thick footſtalk, and in this ſtate has been deſcribed by *Ray*, *Syn. p.* 43. *n.* 15, and by others of the older authors by the very apt name of '*Fucus fungis affinis.*' The frond, which ariſes from the centre of this peziza-form rudiment, exactly reſembles in ſubſtance a leather thong, is without rib or nerve, bears neither leaves nor branches ſtrictly to be ſo called; but is conſtantly dichotomouſly divided at intervals of 3 or 4 inches each, until not unfrequently it attains a length of 2 or 3 yards, and ſometimes much more; and the diviſions, being in proportion to the length, have been found to exceed twenty or thirty. The breadth, which is originally 3 or 4 lines, does not much vary, except towards the extremity, when it becomes narrower and ends in an acute point—The angles formed by the dichotomy are acute. The whole ſurface of the plant is

ſmooth, and it is covered on both ſurfaces with nearly immerſed tubercles, perforated at the top, and filled with ſeeds—Beſides theſe, are obſervable on the recent plant numerous pencils of fine hairs, which have been ſuppoſed by ſome authors to be the ſtamina, and by others the ſtyles; but which are probably organs, by which the plant receives nouriſhment; the ſame being obſervable on the F. *ferratus* and ſome other ſpecies, in which the fructification is ſituated very differently from what it is on this plant.

We have quoted *elongatus* of Linn. as well as *loreus* for this ſpecies, being convinced from a careful examination of the ſpecimens in the herbarium, that they do not differ, and that the breaking of the former, which is deſcribed in *Syſt. Veget.* as characteriſtic of the ſpecies, is merely the effect of drying after having been fixed to the paper. It is further to be obſerved, that the ſpecimen named *elongatus* is mentioned as having been found in the Britiſh ſeas as well as *loreus*, and that no other than the latter and its above-mentioned variety have ever been found ſince on the Britiſh coaſt.

The F. *loreus* is figured in *Act. Gall.* 1772, *part.* 2. *pl.* 3. *f.* 14. y. where the fructification is magnified. It is the work of Meſſrs. Fougeroux de Bondaroy and Tillet. They have examined the marine plants very minutely, but they confound *digitatus* and *bulboſus* together, ſaying the ſtipes is both flat and round. The following remark upon the fructification occurs in their treatiſe:—'J'ai deſſiné une des ramifications de cette plante vue à la loupe; 'l'on y decouvre de petits ſuçoirs que M. de Reaumur a deja re-'marqués, et qui ſont les capſules des grains de ce fucus.' The root is figured pl. 4. f. 18, 19. but the confuſion of F. *digitatus* and *bulboſus* is rather an argument againſt their accuracy as well as judgment.

This ſpecies is found abundantly on the rocks on the ſouth-weſtern

weſtern coaſt, and in various other places. We have gathered it alſo amongſt other rejectamenta on the beach at Yarmouth in Norfolk.

The *var.* β differs from α in having the frond quite plain and flat, very irregularly varying from half an inch to an inch and half in width. The diviſions are much fewer, and the angles of the dichotomy very obtuſe. The pezizæform baſe is ſimilar, and the whole ſurface is ſtudded with fructification ſimilar to α, leaving no doubt of its being a variety of that plant. It was found with α on the ſandy beach at Yarmouth.

### 41. Fucus aculeatus.

F. fronde ſub-cartilagineâ ramoſiſſimâ dentatâ, dentibus marginalibus ſubulatis erectis. *Herb. Linn. Buddle, p.* 14. *Uvedale, p.* 8. *Mor. Hiſt. Oxon.* 3. *ſ.* 15. *t.* 9. *f.* 4. *R. Syn. p.* 48. *n.* 38. *Fl. Dan. t.* 355.

F. muſcoides. *Gmelin, p.* 130. *t.* 12.

F. aculeatus. *Sp. Pl. p.* 1630. *Fl. Ang. p.* 585. *Fl. Scot. p.* 924. *Withering, vol.* 3. *p.* 259. *Stackhouſe, Ner. Brit. p.* 24. *t.* 8.

*Habitat* in rupibus et ſaxis marinis paſſim.

Adhæret rupibus et ſaxis callo craſſo vix explanato—*Frons* 1-2 pedalis, olivaceo-viridis, ad originem cartilaginea, filiformis, teres, craſſitie pennæ corvinæ, in ramos omnino ſimiles, attamen paulo tenuiores, ſtatim dividitur. Hi *Rami* aliis ramis ramuliſque membranaceis, linearibus, ſub-pellucidis, vix quartam lineæ partem latis, utrinque dentatis, dentibus ſubulatis, mollibus, alternis, erectis, ſemilineam circiter longis obſiti ſunt. *Fructificatio*, tubercula minutiſſima nigricantia in ramis ramuliſque, ſparſa.

In this ſpecies a part of the frond is filiform and a part compreſſed; whence it might be conſidered as doubtful under which diviſion it ought be arranged. We have thought proper to place it here, becauſe much the greater part of the plant is linear and compreſſed; and becauſe the ſpecimens which are found ſeparated from their native rocks, have very rarely the lower filiform branches adhering—and therefore, if it had been arranged in the next diviſion, difficulties might have been occaſioned in aſcertaining a plant not otherwiſe eaſily to be miſtaken.

It partakes of the nature of the cartilagineous and membranaceous *fuci*, the lower filiform branches being entirely of the former, and the compreſſed branches abſolutely of the latter deſcription. The ſubulate erect teeth, which proceed from the margins of the ſmaller branches in a regularly alternate order, do not differ in ſubſtance from the branches themſelves, and are like them compreſſed; and this circumſtance prevents the poſſibility of confounding this ſpecies with any other in the genus.

The fructification has been hitherto unnoticed; but we have been favoured with ſpecimens gathered by Dr. Withering on the ſhores of the Tagus, on which are diſcernible extremely minute tubercles, thinly ſcattered on the ſurface and on the margins of the linear branches, almoſt black, and apparently filled with ſeeds. Beſides theſe, in ſome of the older ſpecimens axillary nodules have been diſcovered, having the appearance of congeſted tubercles; but we dare not poſitively aſſert that they are ſuch, and recommend it to botaniſts reſiding on the ſea-ſhore carefully to examine the recent plants, in order to aſcertain the real nature of theſe excreſcences.

The variety mentioned by Mr. Lightfoot, p. 926, under the name of *β caudatus*, has never yet fallen under our obſervation; but that this is the *Muſcoides Sp. Pl. p.* 1630, cannot be doubted, that ſpecies being

being in *Syſt. Veget.* given as a variety of *aculeatus*, and referred to *Gunner. Act. Hidroſ.* 4. *p.* 83. *t.* 7. notwithſtanding this figure is ſo extremely bad that nothing could be conjectured from it alone. To this variety alſo muſt undoubtedly be referred *Muſcoides Fl. Ang. p.* 590. Gmelin has included both under the name of *Muſcoides*.

It is frequent on the northern and weſtern coaſts of Great Britain, and has been found amongſt other rejectamenta on the beach at Yarmouth in Norfolk.

### 42. Fucus corneus.

F. fronde cartilagineâ ramoſiſſimâ, ramis latioribus alternis, ramulis oppoſitis divaricato-adſcendentibus obtuſis.

*Herb. Buddle, p.* 2. *n.* 1.
———, *p.* 38. *n.* 1. 2. 4. } majores.
*Petiver, p.* 25. *n.* 6.

F. ſpinoſus. *Gmelin, p.* 161. *t.* 18. *f.* 3.

F. corneus. *Fl. Ang. p.* 585. *Withering, vol.* 3. *p.* 252.

*Var.* β filicinus—fronde tenui, ramulis horizontalibus obtuſiſſimis.

F. filicinus. *Fl. Ang. p.* 586.

F. nereideus. *Fl. Scot. p.*

*Var.* γ pinnatus—fronde tenui, ramulis patentibus obtuſiuſculis.

F. pinnatus. *Fl. Ang. p.* 586.

*Var.* δ uniformis—fronde tenui, ramis ramuliſque baſi attenuatis patentibus obtuſis.

*Habitat* in littoribus ſaxoſis, in rupibus et ſaxis—α, β, prope Exmouth in Devoniâ—γ in Inſulâ Portlandiâ—δ prope Ilfracombe.

*Var.* α. *Radix* callus minutus—*Frons* ad baſin ipſam ramoſa et quaſi ſurculoſa, ſurculis ſtatim radicantibus, unde frondes plurimæ confertæ exoriuntur, et cava ſaxorum ſæpè cingunt, ex quo radicem

repentem dicas—*Rami* primarii ramulis latiores ſunt, variè ramoſi—*Ramuli* diſtichi, ſub-oppoſiti, modò divaricati, modò adſcendentes, juniores tenues acuti ſub-ſetacei, adultiores paulùm dilatati obtuſi. Hi ramuli aliquando ſimplices evadunt, ſæpiùs apicem verſus ramulos minores gerunt, ejuſdem ac priorum, pro ætate, formæ—*Color* amœnè ruber—*Subſtantia* cartilaginea—*Fructificatio*; tubercula in ramulorum adultiorum apicibus—*Altitudo* 1—4 uncialis.

*Var.* β. Omnia ut in var. α—Sed *frons* omnino tenuis et interdum fere capillaris—*Ramuli* extremi nonnunquam pro habitu frondis valde dilatati—*Ramuli* omnes horizontaliter ſeſe porrigunt—*Frons* ſaturatiùs rubra.

*Var.* γ. *Frons* infernè ſæpè ſimplex et nudiuſcula eſt—*Ramuli* omnes patentes acutiuſculi—In hâc var. fructificationem nondum vidimus.—*Rami* tenues admodum ſub-triplicato-pinnati—*Frons* pallidè rufa.

*Var.* δ. Hæc var. præcedentibus paulò altior exſurgit—*Rami* omnes et ramuli ferè pari latitudine, anguſti ſ. tenues, obtuſi, ramoſiſſimi—*Ramuli* patentes baſi attenuati—*Color* ſaturatius ruber—*Fructificatio* hodie ignota.

We have not proceeded in our arrangement and deſcription of the ſeveral varieties above mentioned, without much caution and repeated examination. That in an artificial ſyſtem they cannot be ſeparated, but are really connected by links of nice gradation, will be evident to any one who will trace them out carefully. We are confirmed in this the more by obſerving, that all botaniſts * have been puzzled in allotting limits to Mr. Hudſon's *corneus*, *pinnatus*, and *filicinus*. The grand character in all is, their throwing

* *Gmelin* remarks *p.* 239—*Fuci* in Flora Anglica Hudſoni *dubii*; F. FILICINUS ET PINNATUS.

out ſmall branches more or leſs horizontal and obtuſe: the variation conſiſts in the breadth or fineneſs of the principal branches, and the proportion which they bear to each other. The difference of ſoil and ſituation moſt likely occaſions this variety of appearance.

We found the two firſt varieties, both ſmall in their kind, on the rocks near Exmouth in Devonſhire—the var. α on the edges of the little cavities of the rocks under the coarſer ſorts, viz. F. *ferratus*, *veſiculoſus*, &c.—the var. β was a little more expoſed. The third var. we have found only on the extremity of the Iſle of Portland near the lighthouſes—the fourth near Ilfracombe, where it is very plentiful. All theſe varieties are readily kept diſtinct from *obtuſus* by their extreme branches being obtuſe and entire, and not truncated.

The ſpecimens preſerved in Buddle are large, and, being blanched, ſo juſtly anſwer his deſcription of *corneus et tenax*, that we preſerve the name *corneus*. The propriety of this appellation is ſeen only in theſe larger and thicker ſpecimens. Mr. Lightfoot does not appear to have ſeen it otherwiſe than in its ſmaller ſtate, ſuch as it appears in our ſecond variety. He called it *nereideus*, from its ſimilarity to the *Nereis*, an animal claſſed by Linnæus among the *Molluſca*.

It is a great argument, we own, for theſe varieties being ſeparated into diſtinct ſpecies, that they are found growing in ſuch diſtant ſituations, and ſo detached from each other; but their limits are not to be aſcertained.

We have not obſerved any fructification upon the two laſt varieties.

### 43. Fucus gigartinus—Tab. 17. Fig. 3, 4.

F. fronde cartilagineâ dichotomâ ramoſâ, ramis æqualibus acutis ſpinoſo-dentatis; tuberculis globoſis lateralibus ſeſſilibus. *Herb. Linn. Murray Syſt. Veg. p.* 971.

*Habitat*

*Habitat* in littore Cornubienſi—*D. Wenman*—Copioſiſſimè ad ſcalas adſcenſûs in ponte marino St. Ives. *D. Loefling* in Herbario Linnæano.

*Radix* callus expanſus, ex quo cauliculi plurimi aſſurgunt, conferti. *Frons* filiformis compreſſa palmaris baſi ſimplex, mox ramoſa rigida. *Rami* dichotomi, ramulis acutis hinc inde dentibus validis cornuum inſtar armatis: hi dentes re verâ rudimenta ſunt aliorum ramulorum. *Fructificationes* globoſæ, dentium axillis, ſive ſub apice dentium affixæ—hinc fructificatio ſæpiùs quaſi mucrone ſive ſetâ aut proceſſu quodam ſubtendi videtur. *Color* nigro-purpureus apicibus dilutioribus, ſæpe olivaceis, quod et in F. *lumbricali* necnon in cæteris accidit. *Subſtantia* cartilaginea.

*Obſ.* Variat magis minuſve compreſſa.

It is but very lately that we have been enabled to claſs this ſpecies among the tribes which adorn our ſhores. We owe this privilege to the information given us by the Hon. Dr. Wenman of All Souls College, Oxford.

It will be readily diſtinguiſhed from any other in this diviſion, by the ſharp thorny appearance of the plant, and by its ſeſſile globoſe ſmooth tubercles, not to mention its rigid texture.

Murray, who was the firſt who gave a deſcription of this plant, mentions the tubercle as ſuſtained by a ſhort footſtalk, which ſubtends and is longer than the tubercle. No dependance can be placed upon this remark. The fructification is always ſeſſile at the baſe or axilla of a little branch. In its perfect form this little branch projects beyond the tubercle; but it is rarely found with any regularity in this ſtate; for, in conſequence of the agitation of the ſea, the branch is often broken off; whence the tubercle appears in its true ſituation, always ſeſſile, ſometimes ſingle on a main

main branch, ſometimes double or treble on a little one, and not unfrequently terminal.

The frond appears ſometimes to have roundiſh branches, ſo as ſcarcely to juſtify our placing it in this diviſion—but they are generally compreſſed, the upper ones always ſo in a greater or leſs degree.

### 44. Fucus coronopifolius.

F. fronde cartilagineâ ramoſiſſimâ, ramulis obtuſis multifidis ſub-confertis; tuberculis globoſis pedunculatis, ſeſſilibuſque. *Herb. Buddle, p.* 12. *n.* 1.—*Petiver, p.* 25. *n.* 3.

Fucus coronopi facie. *R. Syn. p.* 45. *n.* 23.

*Habitat* in rupibus ſubmarinis Dorſetiæ, Devoniæ et Cornubiæ.

Adhæret rupibus callo paullulum explanato—*Frons* 4—6 uncialis, cartilaginea, compreſſa, ſub-diaphana, ſtatim in ramos plurimos diviſa—*Rami* ſæpiùs alterni, nonnunquam dichotomi, apicem verſus tenuiores—*Ramuli* numeroſiſſimi, plerumque conferti, lineares apicibus obtuſis—anguli ramificationum totius plantæ ſemper obtuſi ſunt—*Fructificatio*, tubercula minutiſſima, modò ſeſſilia, modò pedunculata, in ramulis extremis ſita, atro-purpurea—*Color* ex rubro purpuraſcens.

That the plant now deſcribed is the *Fucus coronopi facie* of R. Syn. has been aſcertained from the examination of Buddle's *Hortus Siccus*, where the original ſpecimen gathered by Mr. Stevens on the coaſt of Cornwall is preſerved. We have alſo received ſpecimens from the ſame coaſt, correſponding exactly with that above mentioned.

The *Fucus cartilagineus* of Hudſon ſhould, from his reference to *Ray's Synopſis*, be this plant; but as his ſpecific character is taken

from the *Syſt. Nat.* and as this as well as the other references (except thoſe of Ray and Buddle) certainly belong to *cartilagineus* Linn. or Cape Fucus, it is impoſſible to quote the *Flora Anglica* with any degree of certainty.

The whole plant is ſtrongly cartilagineous; the principal branches are thickeſt in the middle, and attenuated towards the ſides, giving them ſomewhat of a two-edged form, and in the dried ſpecimens ſomewhat of the appearance of a nerve; but this vaniſhes on being held to a ſtrong light. The terminating *ramuli* grow without order, are linear, end obtuſely, and are generally crowded. The angles of the ramification throughout the whole plant are very obtuſe. Theſe particulars ſufficiently diſtinguiſh it from any of its congeners with which it might be ſuppoſed to have any affinity. The fructification conſiſts of globular tubercles, very minute, and apparently ſupported on peduncles, longer, equal to, or ſhorter than the tubercles. When filled with ripe ſeeds, theſe are nearly black. The reſt of the plant is reddiſh purple, the terminating branches paler than the reſt.

Perhaps the tubercles ought, ſtrictly ſpeaking, to be deſcribed ſeſſile on the ſides, or in the axillæ of the ſmall branches at the extremity of the frond. But theſe ſmall branches are almoſt always broken off by the agitation of the ſea. Hence the tubercle is neceſſarily oftentimes terminal, and of courſe to all appearance pedunculated. We have ſeen many ſpecimens, when on the point of producing their tubercles, with their extreme branches perfect, and in this caſe the tubercles ſeſſile, as before obſerved. F. *gigartinus* appears to be affected by the like accidents.

45. FUCUS

### 45. Fucus coccineus.

F. fronde ſub-cartilagineâ ramoſiſſimâ, ramulis ſubulatis ſecundis; tuberculis globoſis ſubſeſſilibus. *Herb. Buddle, p.* 29. *n.* 1. 4. *Petiver, p.* 26. *n.* 1.

F. plocamium. *Gmelin, p.* 153. *t.* 26. *f.* 1. *R. Syn. p.* 37. *n.* 1.

F. coccineus. *Fl. Ang. p.* 587. *Fl. Scot. p.* 955. *Withering, vol.* 3. *p.* 253.

F. cartilagineus. *Fl. Ang. ed.* 1. *p.* 473.

*Habitat* in rupibus ſaxis plantiſve marinis ubique.

*Radix* fibroſa ſurculos emittens unde novæ fiunt plantæ—*Frons* ſolitaria vel numeroſa conferta, dodrantalis aut ſemipedalis, vix cartilaginea, filiformi-compreſſa, craſſitie fili emporetici minoris, coccinea, diaphana, ſupra-decompoſita—*Rami* ramulique nonnunquam alterni, plerumque autem alternatim ſecundi ſunt, i. e. duo vel tres ramuli ex uno ramorum latere, dein duo vel tres ex altero latere alterno ordine prodeunt—*Ramuli* extremi breviſſimi, ſubulati, conſtanter ſecundi—*Fructificatio*, tubercula minima, ex rubro-nigreſcentia, in ramulis ſeſſilia, et nonnunquam, ſed rariſſimè, pedunculata.

This very beautiful ſpecies is diſtinguiſhed from all its affinities by the diſpoſition of its branches, particularly the extreme ones, and by its much brighter colour. The ſecondary branches ſometimes grow alternate, but much more frequently from one ſide of the primary branches, and this in a regularly alternate order, as has been already deſcribed, and in which ſingular diſpoſition of its ramification, this plant differs from all its congeners.—The remaining diviſions of the branches, except the laſt, conſtantly follow the ſame diſpoſition: but the extreme *ramuli* are always clothed with minute ſubulate teeth, growing from one ſide only, and ſomewhat reſem-

bling a comb in form. Theſe teeth, when the plant is dried and diſplayed, give it ſomething of a reticulated appearance, and probably induced Gmelin to adopt the not very appoſite name of *plocamium.*

The fructification conſiſts of minute tubercles ſcarcely ſo large as muſtard ſeed, for the moſt part ſeſſile, it being very rare to meet with one ſupported on a peduncle, affixed to the ſides of the ſmaller branches in conſiderable quantity, but always ſingle, and when filled with ripe ſeeds nearly black. We have obſerved, on ſome ſpecimens, tubercles ſomewhat larger, of the ſame colour as the frond, and always empty. Whether the plant be dicœcious, and this the male fructification, muſt be left to future enquiry.

When old, or expoſed on the beach, the colour is frequently pale yellow or white intermixed with the red; but when young and vigorous, it is never ſeen of any other colour than bright red approaching to ſcarlet, and the moſt brilliant of any of the genus: when dried, this changes to a purpliſh red.

It is found on every part of the Britiſh coaſt, and is very often paraſitical on other plants, particularly the larger Fuci.—We have obſerved it on *veſiculoſus* and *fibroſus*, and alſo on *criſpus*.—When in this ſituation it frequently forms thick tufts not exceeding an inch in height, and might eaſily be miſtaken for a different plant.

### 46. FUCUS PLUMOSUS.

F. fronde ſubcartilagineâ ramoſiſſimâ, ramis ſupra-decompoſito-pinnatis, ramulis oppoſitis; tuberculis globoſis pedunculatis. *Herb. Linn. Buddle, p.* 29. *n.* 7. *Fl. Dan. t.* 350. *R. Syn. p.* 38. *n.* 2. *t.* 2. *f.* 5. *Linn. Syſt. Nat. Fl. Ang. p.* 587. *Fl. Scot. p.* 955. *Withering, vol.* 3. *p.* 254.

*Habitat* in littoribus Britannicis paſſim.

*Radix*

*Radix* callus craſſus—*Frons* purpurea, ſub-cartilaginea, ramoſiſſima; variat longitudine 2—6 uncialis et ultra—*Rami* primarii filiformi-compreſſi, opaci, inordinatim poſiti, in alios ramos ramuloſque compreſſos, ſub-diaphanos, ſupra-decompoſitos dividuntur—*Ramuli* terminales oppoſiti, patentes, modò ſubulati dentati, nonnunquam ſimplices, ſæpiùs ſpinis mollibus ſubulatis pinnati ſunt—*Fructificatio*, tubercula globoſa, pedunculata, atro-purpurea, in ramulis ſupremis ſita, matura quadrifariàm dehiſcentia.

If this ſpecies cannot rival *coccineus* in brilliancy of colour, it is far ſuperior in the elegant form of its ramifications, giving it the appearance of a beautifully branched feather, which ſufficiently diſtinguiſhes it from all in the ſame diviſion.

It varies ſomewhat in different ſituations, and, when the extreme *ramuli* are more diſtant than uſual, ſomewhat reſembles ſome of the varieties of *corneus*. It may nevertheleſs always be diſtinguiſhed by the form of the main branch and its ſub-diviſions, which are always between filiform and compreſſed, of a darker colour than the reſt of the frond, and opake; whilſt in the narrow varieties of *corneus*, they are flat, alike in colour, and have always ſome degree of tranſparency.

This plant varies extremely in ſize. On the ſouthern coaſt it rarely exceeds three inches in height, and is frequently much ſmaller, as repreſented by Dillenius in *R. Syn.*—In Scotland it riſes often to ſix inches or more, as has been obſerved by Mr. Lightfoot; and we have ſpecimens now before us gathered at Scarborough, which are full ſix inches in height.

The ingenious author of the *Flora Scotica* has well deſcribed the fructification, except that the tubercles before burſting appear to us to be rather globular than oval.

A con-

A conſiderable variation of appearance is obſervable in the extreme ramifications, which are oppoſite, uſually naked at the baſe, and pinnated at the ſummit; but are ſometimes alternately ſhort and long, the ſhorter being ſubulate, and either entire or finely toothed, and the oppoſite one pinnated, with ſubulate proceſſes.

The figure in *Fl. Dan.* repreſents the larger ſpecimens of this plant, but without the delicacy obſervable in the original. *F. plumoſus* of Gmelin is moſt probably our plant; but ſome little doubt cannot but ariſe from the *ramuli* being deſcribed as ſub-articulate; which ſeems rather to point it out to be *Conferva plumoſa*, as we have never obſerved the ſmalleſt appearance of articulations in the plant now deſcribed.

### 47. FUCUS NODOSUS.

F. fronde ſubdichotomâ, foliis diſtichis obovatis, integerrimis; veſiculis innatis ſolitariis fronde latioribus. *Herb. Linn. Buddle, p.* 13. opt. *Petiver, p.* 35. *Uvedale, p.* 3*. *Gmelin, t.* 1. B. *f.* 1. *Fl. Dan.* 146. *Hiſt. Ox. ſ.* 15. *t.* 8. *f.* 2. *Reaumur, Acā. Gall.* 1712, *p.* 26. *t.* 2. *f.* 3. *Linn. Sp. Pl.* 1628. *Fl. Angl.* 584. *Fl. Scot.* 918. *Withering, v.* 3. *p.* 251. *Ray. Syn. p.* 48. *n.* 41.

*Habitat* in littoribus Britannicis ubique.

*Radix* callus expanſus craſſiſſimus. *Frondes* plurimæ e radice oriuntur, lineares compreſſæ craſſæ. Diviſura ramorum varia, plerumque autem dichotoma. *Folia* diſticha, gemina vel plura obovata integerrima, in petiolum attenuata, unde aliquantulum ſpatulata, tandem mucoſa intumeſcunt & tuberculis numeroſis repleta ſunt. *Veſiculæ* ellipticæ, ovatæ, ſolitariæ, diſtantes, caule ramiſque innatæ, & his bis terve latiores. *Color* recentis plantæ olivaceus, ſiccatæ niger.

ger. *Subſtantia* cartilaginea omnino coriacea et tenax. *Altitudo* variat —ad duas ulnas.

This Fucus is ſo common and ſo well known, that any long deſcription of it muſt be unneceſſary: the large elliptical veſſels or air-bladders, which form its moſt conſpicuous character, and from which its trivial name is taken, ſufficiently diſtinguiſh it from all other Britiſh ſpecies. Theſe veſicles are ſolitary, diſtant from each other, much wider than the ſtalk, and decreaſe regularly in ſize from the loweſt to the uppermoſt on each frond or branch. The lower part of the frond is uſually deſtitute of veſicles as well as leaves; but there is always a ſmall veſicle above the uppermoſt leaves, from which the branch continues again naked to the ſummit, which is obtuſe. The diſtichous leaves in an advanced ſtate are ſwelled, replete with mucus, and contain numerous tubercles, each having a correſponding opening on the ſurface of the leaf.

It is common on every part of the Britiſh coaſt, on the rocks, and alſo on the piles and other wood-work of the harbours, and is often adorned with large tufts of *Conferva polymorpha*, which appears particularly to attach itſelf to this ſpecies of Fucus.

The veſicles vary in ſize from the bigneſs of a pea to that of a crow's egg, and even larger.

### 48. Fucus obtusus.

F. fronde cartilagineâ ramoſiſſimâ, ramis ramuliſque ſub-oppoſitis erectiuſculis obtuſiſſimis truncatis.

*Fl. Ang. p.* 586. *Withering, vol.* 3. *p.* 253.

*Habitat* in rupibus et ſaxis marinis haud infrequens—In Inſula Portlandiæ—prope Weymouth—Exmouth.

*Radix* callus minimus ſurculos protrudens unde novæ fiunt plantæ—*Frons* ſolitaria vel numeroſa, compreſſa, purpuraſcens, 3—4uncialis, craſſitie fili emporetici minoris, ramoſiſſima—*Rami* ſæpiùs oppoſiti, rarò ſparſi, baſi attenuati—*Ramuli* ſeſſiles, ſed breviſſimi, erectiuſculi, apicibus incraſſatis obtuſiſſimis truncatis—*Fructificatio*, tubercula minuta in ramulorum apicibus, necnon ad ramorum latera ſita, atro-purpurea.

This ſpecies, which appears to have been firſt deſcribed by the author of the *Flora Anglica*, cannot be confounded with any in this diviſion, unleſs the varieties β and γ of *corneus*, from both which it is eaſily to be diſtinguiſhed by being, though cartilagineous, of a more tender ſubſtance; by having the branches attenuated at the baſe; and, notwithſtanding they are compreſſed, not ſo completely flattened; by the ſomewhat erect growth of the *ramuli*; and more particularly by having the branches truncated at the end, and by the fructification: this conſiſts of minute nearly black tubercles, ſituated in the dilated terminations of the *ramuli*, as deſcribed by Mr. Hudſon; and alſo, as we have obſerved not unfrequently on our ſpecimens, on the ſides of the larger as well as the ſmaller branches. The primary frond is continued throughout, the branches are ſhort near the baſe, longer in the middle, and very ſhort towards the ſummit, giving the whole an ovate form.—The principal branches are clothed with ſecondary ones growing in the ſame manner, and theſe with the extreme *ramuli*; nor have we obſerved it farther divided.

### 49. FUCUS LICHENOIDES.

F. fronde dichotomâ ramoſâ, ramis apice dilatatis; tuberculis globoſis terminalibus.

Lichen ſaxatilis, maritimus, muſcoſus, minimus, nigerrimus. *Michel. Nov. Gen. p.* 103.

F. pygmæus. *Fl. Scot. p.* 964. *t.* 32. *Withering, vol.* 3. *p.* 232.

F. pumilus. *Fl. Ang. p.* 584.

*Habitat* in rupibus et ſaxis marinis inter fluxum et refluxum maris frequens—in Inſulâ Portlandiæ—prope Ilfracombe—in Inſulâ Juræ.

Ex callo minuto expanſo lateſcenti cauliculi plurimi oriuntur—*Frons* a primo ortu ramoſa ſit, ramis radicantibus, unde repentem dicas—Ad ipſam baſin cauliculi teretes ſunt, at ſtatim compreſſi, et in cartilaginem dichotomam dilatati—Apices ramorum obtuſi, ſubtruncati—*Fructificatio*, tubercula ſæpiùs glabra veſiculas referentia, apice pertuſa, ipſis ſummitatibus ramulorum adhærentia—*Color* variat olivaceus, viridi-olivaceus, niger, ater—*Subſtantia* cartilaginea—*Altitudo* ½—1uncialis.

Wherever this little Fucus is found, it covers whole maſſes of ſtones in the manner of Lichens. From its great likeneſs to this genus, we have changed the unintereſting names of Mr. Lightfoot and Mr. Hudſon to *Lichenoides*. This very appellation will lead to its diſtinction.

Mr. Lightfoot was ſo ſtruck with this ſimilarity, that his whole deſcription dwells upon it.—His figure is excellent.

The fructification of this little ſpecies is ſomewhat ſingular. Generally ſpeaking, it is a round and perfectly ſmooth tubercle, reſembling a minute bladder, opening more or leſs at the top; but we ſee occaſionally minute granulations on the ſurface of it.

### 50. Fucus filum.

F. fronde filiformi ſimplice ſub-fragili. *Herb. Lin.*—*Buddle*, *p.* 24.

*p.* 24. *n.* 2.—*Petiver*, *p.* 35.* *n.* 2. *Uvedale*, *p.* 6. *n.* 4. *R. Syn.* *p.* 43. *n.* 3. *Fl. Dan. t.* 821. *Linn. Sp. Pl. p.* 1631. *Fl. Ang.* *p.* 587. *Fl. Scot. p.* 963. *Withering*, *vol.* 3. *p.* 254.

*Habitat* in rupibus et saxis marinis apud Cromer in Norfolciâ & alibi frequens.

*Radix* callo minimo expanso—*Frons* simpliciſſima, sæpiùs conferta, aliquando solitaria, filiformis, teres, glabra, craſſitie pennæ corvinæ, ad duarum vel trium ulnarum longitudinem sæpè extenditur; basi apiceque attenuato, cetera uniformis—*Substantia* membranacea et subfragilis, fistulosa, constanter cava absque medullâ—Annuli plurimi per totam cavitatem irregulariter positi, confervarum septa æmulantes, visi sunt—*Color* recentis plantæ olivaceo-viridis, siccatæ niger—*Fructificatio* incognita.

This species differs from all other *Fuci* in habit, and has been supposed by some authors to belong more properly to the genus *Conferva*, from having the appearance of transverse septa or diaphragms through the whole length of the frond. On holding the plant to the light, it will however be observed that these apparent septa are placed at unequal distances, are frequently oblique, and that there are no corresponding contractions visible on the exterior surface; in all which particulars it differs from the *Confervæ*. If the recent plant be dissected longitudinally, and examined with a glass, it will be found, that instead of septa these are merely rings formed on the internal substance of the tube, and that no diaphragms whatever can have been connected with them, as they are uniform, and covered with a slight woollineſs exactly in the same manner as the rest of that surface. They do not appear to contain the fructification, and may perhaps be intended only to strengthen the plant, and to enable it the better to maintain its round and tubular form.

We

We have never obſerved any kind of fructification in this ſpecies, and it is very doubtful whether it be really a *Fucus;* if not, it certainly has more affinity with ſome plants at preſent placed in the genus *Ulva*, than with any of the *Conferv*æ. It very much reſembles the *Ulva fiſtuloſa* of the *Flora Anglica*, particularly in a young ſtate, but differs in its much more extended growth, by being leſs tender and fragile, and, moſt of all, from the internal annuli, which are never obſervable in the latter plant.

It may be proper to obſerve, that the reference in *Sp. Pl.* to *Am. Acad. p.* 259. *t.* 3. *f.* 2. is erroneous; what is there deſcribed being *Fucus Tendo*, a production now well known to belong to the animal and not to the vegetable kingdom.—This ſpecies is ſometimes met with extremely twiſted.

### 51. Fucus tomentosus.

F. fronde filiformi ramoſiſſimâ tomentoſâ; ramis dichotomis apicibus anguliſque obtuſis. *Herb. Buddle, p.* 34. *n.* 5. opt. *Petiver, p.* 42. *n.* 5. opt. *Moriſon, Hiſt. Ox.* 3. *ſ.* 15. *t.* 8. *f.* 7. *Petiver, Gaz. t.* 4. *f.* 12.

Spongia dichotomos teretifolia viridis. *R. Syn. p.* 29. *n.* 3.

———————— compreſſa ex viridi-ſplendens. *R. Syn. p.* 29. *n.* 4.

F. tomentoſus. *Fl. Ang. p.* 584.

F. elongatus. *Withering, vol.* 3. *p.* 251. *Stackhouſe, Ner. Britt. p.* 21. *t.* 7.

*Habitat* in Inſulâ Portlandiæ, ſed rariùs—prope Exmouth—prope Plymouth, et per totum littus Cornubienſe auſtrale; frequens nullibi.

*Radix* nulla niſi baſis frondis paululum explanata—*Frons* 4—6 uncialis, filiformis, vix ac ne vix compreſſa, craſſitie pennæ anſeri-

næ, ramoſiſſima—*Rami* dichotomi, apicibus necnon angulis ramificationum obtuſis—*Subſtantia* membranacea, fiſtuloſa, extùs tomentoſa ſeu potiùs velutina, ſplendens—*Color* viridis—*Fructificatio* incognita.

The frond in this ſpecies is ſlightly compreſſed; but as it approaches much nearer to a round than to a flattened form, it ſeems to belong more properly to this diviſion than to the preceding.

The whole plant is membranaceous and hollow, covered with a gloſſy velvet down, which ſufficiently diſtinguiſhes it from all with which it might be ſuppoſed to have any affinity. From theſe circumſtances, and from there never having been yet any fructification diſcovered, it is very doubtful whether it may not belong to the genus *Ulva;* but till this can be aſcertained, we have thought it moſt proper to continue it in the ſituation where it has been hitherto arranged.

The root is merely an expanſion of the frond, by which it adheres to the rocks.—It is of a graſs green colour, much branched, the branches dichotomouſly divided with obtuſe angles; the terminating forks 2, 3 or 4, varying in length from a line to half an inch, more or leſs blunt, with the angles very much rounded. The plant retains water like a ſponge, and is as eaſily preſſed dry; a circumſtance noted in Ray's *Synopſis*.

This ſpecies is erroneouſly referred in the *Flora Anglica*, and in Withering's *Bot. Arrang.* to *elongatus* Linn. which we believe not at all to differ from *loreus*, and to which it has not the ſmalleſt affinity. That it is the plant figured in Moriſon, the *Spongia dichotomos teretifolia viridis* of *R. Syn.* cannot be doubted; nor do we heſitate to refer to this the *Spongia dichotomos compreſſa ex viridi-ſplendens* of Dillenius *R. Syn.* found by Mr. Stevens on the coaſt of Cornwall, having in our poſſeſſion

poſſeſſion ſpecimens agreeing exactly with the deſcription, and with the figure of Petiver there quoted.

We have never had an opportunity of examining this ſpecies in a recent ſtate, but have been favoured by Mr. Stackhouſe with a drawing accompanied with an account of the plant; from which, and from dried ſpecimens, we have been enabled to draw up the foregoing deſcription.

The dried ſpecimens, preſerved in Petiver's and Buddle's *Hortus ſiccus* in the Britiſh Muſeum, are exceedingly good ones.

### 52. Fucus diffusus.

F. fronde filiformi dichotomâ articulatâ; ramis divaricatis diffuſis apice acutis. *Fl. Angl. p.* 589.

*Habitat* in rupibus & ſaxis ſubmarinis—apud Weymouth, Haſtings, & alibi.

*Radix* callus parvus expanſus—*Frons* filiformis, dichotoma, ramoſa, ſæpiùs ramoſiſſima, fili emporetici minoris craſſitie, ramis divaricatis, diffuſis, articulatis, articulis breviſſimis, apice acutis—*Magnitudo* biuncialis, dodrantalis—*Subſtantia* cartilaginea—*Color* rubens—*Fructificatio* nondum a nobis viſa eſt.

We have felt ſome little difficulty in arranging this ſpecies among the *Fuci*. Its habit and jointed form, and want of fructification as far as we have been able to obſerve, indicate ſo cloſe an affinity to the genus *Conferva*, that we were almoſt tempted to omit it. However, as we have reaſon to believe that this is the plant deſigned by Mr. Hudſon, under this name, we looked upon the *onus probandi* as laid upon us, if we ventured to alter his arrangement. The ſubſtance is of a firmer texture than *Confervæ* uſually are;

are; and perhaps that circumſtance influenced his judgment. At the time in which he wrote, that appearance had greater force than perhaps it deſerved.

We have never yet ſeen it in fructification: could that be found, we ſhould have ſure grounds for our determination.

This is by no means an uncommon plant. It may be found on moſt rocky ſhores. Its beautiful red colour, and its extremely diffuſe and divaricated habit, render the inveſtigation of it perfectly eaſy. Under a glaſs, and even to the naked eye ſometimes, the branches appear jointed with very ſhort joints.—They are always ſharp-pointed. In a recent ſtate it is of a fine lively red: in drying, it becomes quite of a dark or black red colour.

### 53. FUCUS TUBERCULATUS.

F. fronde filiformi dichotomâ; ramis inæqualibus obtuſis apice tuberculatis, angulis ramificationum obtuſis. *R. Syn. p.* 43. *n.* 13. *Fl. Ang. p.* 588.

F. bifurcatus. *Withering, vol. 3. p.* 257. *t.* 17. *f.* 1.

*Habitat* in rupibus marinis in Inſulâ Portlandiæ—Ilfracombe in agro Devon.—St. Ives in agro Cornub.

Adhæret fortiter rupibus callo explanato—*Frons* teres filiformis, craſſitie pennæ corvinæ 2—11uncialis & ultra, erecta, glabra, olivacea—cito fit dichotoma, angulis obtuſis, ramis ramuliſque inæqualibus—Dichotomiæ variant pro magnitudine plantæ 1-2-3 plurimæ—*Fructificatio*, ſemina obtuſa in apicibus ramulorum tuberculatorum incluſa.

This ſpecies is ſufficiently diſtinct from all its affinities: from *lumbricalis*, *faſtigiatus* and *radiatus*, by having its branches of unequal lengths,

lengths, and not faſtigiated or level; from *diffuſus*, by having its branches all blunted at the end, and ſwelled by the fructification included in them; and from *plicatus*, by its upright, ſimple and unentangled growth.

The plants found at the Iſle of Portland are uſually of humble growth, and are well repreſented by Dr. Withering's figure: but at Ilfracombe in the north of Devonſhire they are of a much taller figure, and the diviſions of the frond are very numerous.

The fructifications are always at the ends of the branches, and imbedded in the ſubſtance of them. The plant in a recent ſtate is always of a pale olive colour, but when dried it turns nearly or quite black.

It adheres to the firmeſt rocks very ſtrongly by means of a thick leathery ſubſtance, from which ſeveral ſtalks ſometimes ariſe in a ſort of cluſter. We have never obſerved it growing upon moveable ſtones, but only on the fixed firm rock.

### 54. Fucus fastigiatus.

F. fronde filiformi dichotomâ ramoſiſſimâ; ramis faſtigiatis obtuſis, angulis ramificationum ſub-rectis. *Herb. Linn. Petiver, p.* 31. *n.* 4. *Moriſon, Hiſt. Ox.* 3. *p.* 649. *ſ.* 15. *t.* 9. *f.* 9. *Fl. Dan.* 393. optima.

*Var.* β Interceptus. Dichotomiis ultimis omnibus geniculato-annulatis.

*Habitat* in rupibus et ſaxis marinis paſſim—β apud Cromer in Norfolciâ.

*Radix* callus expanſus—ſed frons ad baſin valde ſurculoſa—Surculi ubi ſaxa attingunt diſco novo explanato, qui radix alterius fit, ſæpiùs adhærent, unde cauliculi plurimi conferti aſſurgunt—Hi cauli-

culi modò erecti modò procumbentes, diffuſiuſculi, teretes, ramoſiſſimi, dichotomi, ad apicem ſæpè trifidi, apicibus obtuſis—Anguli ramificationum magis patentes quam in affinibus, immò ſub-recti—*Rami* faſtigiati, et ſæpiſſimè ad ultimas dichotomias annulati et quaſi geniculati—Eſt ubi vix ac ne vix unum geniculum adeſt—Interdum ut in β omnis extrema dichotomia annulo ornatur—*Subſtantia* cartilaginea—*Color* nigro-olivaceus, in apicibus ramorum ſæpè vireſcens, pallidus—*Fructificatio*, tubercula lateralia in ramis ramuliſque ſparſa—*Altitudo* in α 1—3uncialis et ultra; in β 3—7uncialis.

The different appearances which this plant aſſumes have created no ſmall trouble in endeavouring to ſtrike out a proper ſpecific character. This difficulty has ariſen in no ſmall degree from that appearance of rings which is obſervable in ſome, but more eſpecially in the larger ſpecimens. They have perplexed many.

We have diſſected many of theſe rings in various directions, and have never been able to diſcover any tendency to fructification in them. We obſerve alſo, in general, that theſe rings very ſeldom occur in the ſmaller plants. We mention theſe two circumſtances as grounds of argument, that the rings ought to have nothing to do in conſtituting the ſpecies; for we argue that they are owing to an injury having been received, and in conſequence, the progreſs of growth being carried on by a new branch ſhooting out from the internal part, a ſort of callous ſcar, or annular ſeam, remains as a memorial of the truncation of the part. Thus, as this is no organ of fructification, we ſay it is not a neceſſary part; and as it is not conſtant in the ſmaller ſpecimens (by ſmaller we do not mean younger, for the ſmaller ſpecimens we ſpeak of are ſo from ſoil and ſituation) we argue it is no character. We are therefore fairly at liberty to uſe our own ideas, and ſuppoſe theſe rings merely as the effect of injury.

Our

Our firſt variety entirely accords with the ſpecimens in the Linnæan Herbarium. We found it in great plenty on the rocks at Ilfracombe. It there ſeldom exceeded three inches in height: it grew erect and compact, the branches of the thickneſs of ſmall wire, and ſcarcely a ring upon them. Very few of the branches (probably owing to their humble growth and firm texture) had ever ſuffered any injury. At Haſtings we have found it from three to nearly five inches in height. The plants were all ſomewhat diffuſe and procumbent. The injuries done them (being very much expoſed to the force of the waves) were frequent, and the rings (for rings are almoſt conſtantly attendant upon the injuries, at leaſt where the injury has not ſtopped the farther growth of the plant) were obſervable in proportion. As theſe plants grew taller, ſo alſo their branches are ſomewhat thicker than at Ilfracombe.

At Cromer in Norfolk we have met with our variety *β interceptus* in abundance. We ſo call it from all the branches having almoſt conſtantly theſe annular calloſities juſt at their laſt diviſion. It here grows to the height of ſix or eight inches, and the branches are all proportionably thicker. In this variety the branches produced after the annular proceſs are more pellucid (owing perhaps to the thinneſs of the new tender ſubſtance) than uſually is ſeen in the former: but nothing is more common than to ſee, in all ſtages of growth, the tips of the branches greeniſh and of a clearish caſt.

Two things are too ſtriking not to be mentioned: firſt, that theſe rings are never to be ſeen but at the extremities of the frond, and when the length of the branches makes them more capable of being broken off; and farther, that no one branch has ſcarcely ever more than one ring. All ſubjects in nature are endued with a power of repairing ordinary injuries; but reparation is the conſequence of

extraordinary exertion, and of courſe there is not ſtrength to repeat it often. We apprehend that this is the caſe with our preſent plant: having received an injury, it is capable of making a feeble effort to reſtore itſelf, and after that ſubmits to its fate.

We have thus deſcribed faithfully what we have ſeen. If any one ſhould doubt our ſolution of the phenomenon of the rings, perhaps if he reſides for any length of time on the ſea-ſide, and will take the trouble of marking any particular plant, and will cut, or rather break off, the extremities of the branches, poſſibly he may ſee the reparation made in the manner which we have mentioned.

It differs from *lumbricalis* by the wide opening of the ramifications of the branches approaching almoſt to a right angle; and from that and *radiatus* by the ſhortneſs and bluntneſs of the branches. *Lumbricalis* has theſe rings occaſionally, but, being of a firmer texture, is more ſeldom broken off, and of courſe bears fewer marks of reparation.

Specimens whereon the rings are to be ſeen, remain in *Uvedale's* Herbarium, *p.* 9. *n.* 4. and in the Collection by *Buddle and Vernon*, *p.* 18. *n.* 5. This laſt anſwers very nearly to our deſcription of var. *β*.

### 55. FUCUS RADIATUS.

F. fronde filiformi dichotomâ ramoſâ, ramis ſubæqualibus acuminatis, angulis ramificationum obtuſiuſculis; tuberculis lateralibus.

F. rotundus. *Gmelin*, *p.* 110. *t.* 6. *f.* 3. *R. Syn. p.* 45. *n.* 24. var. ad finem.

*Habitat* in ſaxis marinis apud Cromer in Norfolciâ.

Adhæret ſaxis callo explanato, ſurculos emittente, unde novæ fiunt

ſiunt plantæ—*Frons* teres, filiformis, ſub-diaphana purpurea, 4—6 uncialis, craſſitie fili emporetici minoris, dichotoma, ramoſa, angulis ramificationum obtuſioribus—Ramorum ſummitates attenuatæ, acutiſſimæ—*Fructificatio*, tubercula hemiſphærica verrucoſa, magnitudine ſeminis rapi, diſtantia, ad latera ramorum.

This ſpecies is unnoticed in the *Flora Anglica*, but is certainly mentioned by Ray as a variety of *lumbricalis*, *Syn. p.* 45. *n.* 24 ad finem—'*hanc ſpeciem cum nodulis ſolidis per intervalla mediis cauliculis et ramulis innaſcentibus obſervavit rever. vir D. Manningham.*'—This deſcription clearly points out the preſent plant. From Gmelin's deſcription of his F. *rotundus* we have no doubt of this being his plant; but the figure is bad, repreſenting the ſummits very ſhort and very obtuſe, which in the growing plant are extremely acute. The tubercles are well repreſented as they appear in the dry, not in the recent plant—but we have never obſerved them ſo near the ſummits of the branches; from which, and from the ſhort blunt terminations, it is probable the figure was taken from a ſpecimen in which the extremities were broken off by the waves.

The plant, when growing, expands in a radiated or umbellated form, and has blunt angles; whence the rounded appearance of thoſe angles when dry. The dichotomy is more exact in this ſpecies than in any of its affinities, the correſponding branches generally dividing very regularly at the ſame height. The perfect tubercles when recent, are of a pale pink or fleſh colour, rough on the ſurface, and are extremely reſembling to the head of the *Sphæria entomorrhiza* as repreſented in Dickſon's plate *Crypt. faſc.* 1. *t.* 3. *f.* 4. —In this ſtate the ſeeds, which are of a full bright red colour, may be diſcerned with a good common eye-glaſs. When the plant is dry, the tubercles acquire the ſame colour as the reſt of the plant.

Before the ſeeds are ripe, the tubercles appear as repreſented in Gmelin's figure, and have conſtantly one or two furrows acroſs them. They are ſituated on the upper part of the frond, but not on the extreme diviſions, and are uſually diſtant, but ſometimes two or three are found aggregate.

This ſpecies is readily diſtinguiſhed from all its affinities, by its expanded leathery root—its very different mode of fructifying—its very acute terminations—and by its brighter and more tranſparent purple colour, which is clearly diſcernible when dry, if the plant be held to a ſtrong light.

It grows on the large ſtones at Cromer on the coaſt of Norfolk, and is found amongſt other rejectamenta at Yarmouth and other places to the ſouthward.

### 56. FUCUS LUMBRICALIS.

F. fronde filiformi dichotomâ ramoſâ, ramis ſub-æqualibus acuminatis, angulis ramificationum acutis. *Herb. Buddle, p.* 11. *n.* 1, 2, 3. *Petiver, p.* 31. *n.* 8.

*R. Syn. p.* 45. *n.* 24, 25. *Moriſon. Hiſt. Ox. ſ.* 15. *t.* 9. *f.* 4. 9.

F. faſtigiatus. *Fl. Ang. p.* 588. *Fl. Scot. p.* 930. *Withering, vol.* 3. *p.* 257. *Gmelin, p.* 106. *t.* 6. *f.* 1. *Stackhouſe, Ner. Britt. p.* 15. *t.* 6.

F. furcellatus. *Fl. Ang. p.* 589. *Fl. Scot. p.* 930.

F. faſtigiatus β. *Withering, vol.* 3. *p.* 258.

F. lumbricalis. *Gmelin, p.* 108. *t.* 6. *f.* 2. *Fl. Ang. ed.* 1. *p.* 471.

*Habitat* in littoribus marinis ubique.

*Radix* fibroſa ſurculos emittens e quibus frondes plurimæ exoriuntur—

untur—*Frons* individua 4—6uncialis, craſſitie fili emporetici, teres, filiformis; primum ſimplex, dein ramoſa, ramis dichotomis faſtigiatis. In quibuſdam plantis, ramorum apices breves, et in formam ovalem, hinc concavam, illinc convexam dilatatæ—In aliis, Frons terminatur furcellis teretibus, incraſſatis, uncialibus et ſeſquiuncialibus, mucilagine ſeminiferâ repletis—*Color* recentis plantæ nigro-rubeſcens, ſiccatæ nigerrimus.

The plant now deſcribed includes the two ſpecies of *faſtigiatus* and *furcellatus* of Hudſon and Lightfoot—and *faſtigiatus* and β of Withering. But as the *faſtigiatus* and *furcellatus* of Linnæus are now known to be different plants from either, we have thought it proper to give the name of *lumbricalis* to this ſpecies, after Gmelin and the firſt edition of *Flora Anglica*.

The late Mr. Lightfoot doubted whether his *faſtigiatus* and *furcellatus* were diſtinct; and we have poſitive proof that they are not to be conſidered even as varieties, having in our poſſeſſion a ſpecimen gathered from the beach at Yarmouth, in which both are ſeen ariſing from the ſame root, and in which the dichotomy of one branch actually exhibits both ſorts. This diſcovery has made it very difficult properly to deſcribe this plant, the terminations being ſo very different under theſe varying circumſtances. It ſeems however probable, that what has been called *faſtigiatus* has not really any fructification; for though theſe oval terminations have on their concave ſide a mucilaginous appearance, no ſeeds are ever obſerved in them: but when the ſwelling forks of the other are in a mucilaginous ſtate, the ſeeds imbedded in the mucilage are very apparent.

This ſpecies differs from *radiatus* in its fibrous root, the very acute angles of the ramification, and in its ſwelling pod-like extremities.

It

It differs from *faſtigiatus β interceptus*, in its higher growth and larger ſize—in being uſually deſtitute of geniculations—in its conſtantly regular dichotomous terminations—in having the extreme branches in the fructifying ſtate, in which only it could be miſtaken, much longer and thicker—and in colour, this being dark reddiſh and ſomewhat pellucid whilſt freſh, though turning black when dry; in which ſtate alſo the ſhort oval terminations of the *faſtigiatus* of the Engliſh authors contract and become ſubulate and acute. The differences between this plant and the *faſtigiatus* of Linnæus are pointed out under that ſpecies.

It adheres to the rocks and ſtones by ſtrong fibres, throwing out ſhort creepers, which produce other plants, all together frequently forming large maſſes, and is found on almoſt every part of the Britiſh coaſt.

### 57. FUCUS KALIFORMIS. TAB. 18.

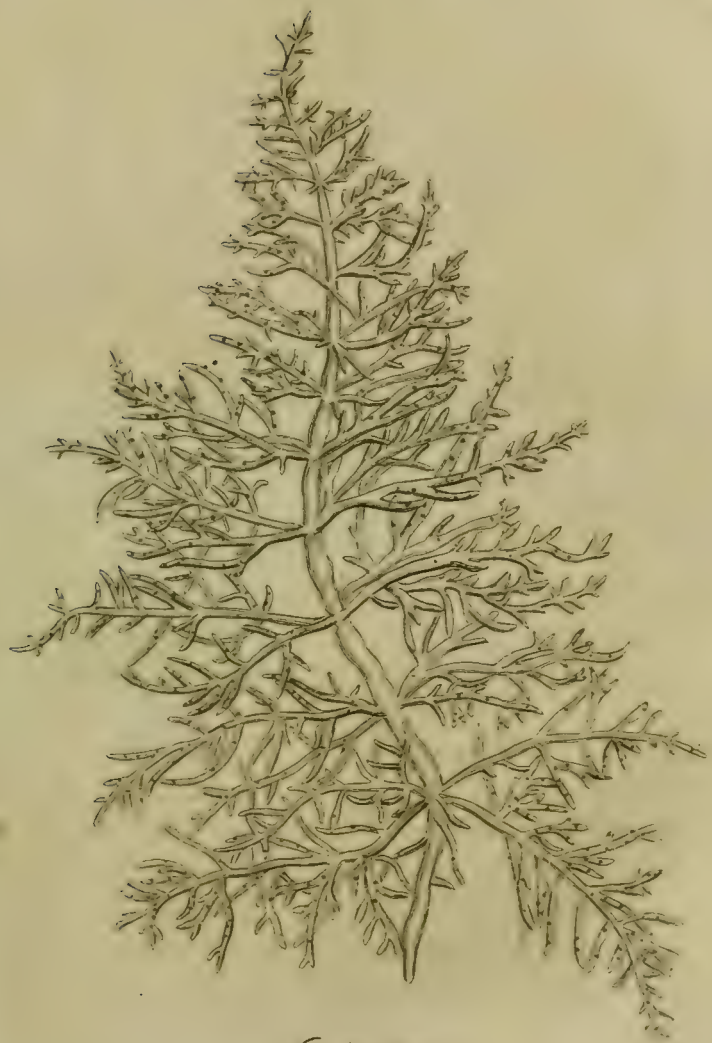
F. fronde filiformi ſub-gelatinoſâ tubuloſâ ramoſiſſimâ, ramis ſparſis, ramulis ſub-verticillatis ſubulatis obtuſiuſculis.

*Habitat* apud Weymouth. *D. Stackhouſe*—inter rejectamenta maris apud Yarmouth in Norfolciâ legimus, necnon apud Exmouth in Devoniâ.

*Radix* callus minimus craſſus—*Frons* 4—6uncialis et ultra, filiformis, ſub-gelatinoſa, tubuloſa, modò craſſitiem pennæ corvinæ ſuperat, modò paſſerinæ vix æquat—Statim a radice in ramos plurimos dividitur; hi rami aliis vix minoribus nunc oppoſitis nunc alternis, frequentiùs inordinatim poſitis ornati ſunt—*Ramuli* ſupremi ſubulati, obtuſiuſculi, breves, ſub-verticillati—*Fructificatio*, tu-

 bercula

Linn. Trans. VII. tab. 18. p. 206.



T. halyformis.

A.J.G. delin.

bercula minuta ſphærica, ex rubro nigrèſcentia ad latera ramorum ramulorumque ſeſſilia—*Color* pallidè rubeſcit.

This elegant ſpecies approaches neareſt to the *verticillatus* of Lightfoot, but appears to differ in ſubſtance, in colour, and in the form and diſpoſition of the branches, as will be obſerved by comparing the deſcriptions together.

The ſubſtance of this is tender and approaching to gelatinous. The branches which divide directly from the root are filiform, tubular like thoſe of *verticillatus*, but without any tendency to articulations as obſervable in the latter ſpecies. They vary extremely in ſize; plants found by Mr. Stackhouſe on the coaſt of Cornwall exceeding the thickneſs of a crow's quill, whilſt ſuch as have been found on the beach at Yarmouth ſcarcely equal that of the ſparrow. Theſe branches have ſometimes a waved or twiſted mode of growth, but this appearance is not ſufficiently conſtant to form a characteriſtic mark. The ſecondary branches vary extremely in their manner of proceeding from the primary: ſome are oppoſite, others alternate, but much the larger part appear to grow without any order. The extreme ramuli, which are ſhort, ſubulate, and terminate rather obtuſely, are very often verticillate, generally 3 or 4 in a whorl, and, when not regularly ſo, have always a viſible tendency to that diſpoſition.

The fructification conſiſts of globular tubercles ſeſſile on the ſides of the ſmaller branches, ſo minute as ſcarcely to be diſtinguiſhed by the naked eye, bright red, and when filled with ſeeds, nearly black. The colour of the ſpecimens we have ſeen is a pale watery red; but it is not improbable but it may be ſometimes found mixed with green, this change being obſervable in moſt of the gelatinous *fuci*. In a very young ſtate its finer branches are ſometimes

ſo

ſo attenuated at the baſe, as to appear to be leaves, not unlike thoſe of *ſedoides*.

We have received ſpecimens of this plant from a variety of correſpondents and friends, who one and all have ſent it to us under the name of F. *verticillatus of Mr. Lightfoot*. It is a matter of great regret to us that we could not meet with his original ſpecimen. If this be his plant, it is to be feared that his figure in the *Fl. Scotica* is not accurately drawn, the laſt diviſion of the branches being more capillary than we have ever obſerved them to be—Or perhaps he had his figure taken from a plant more luxuriant in its form than our ſouthern latitudes ever produce.

Our worthy and accurate friend Mr. Davies ſent us a ſpecimen very much reſembling Mr. Lightfoot's figure in every reſpect except the capillary branches. He met with it on the coaſt of the Iſle of Angleſey. Nevertheleſs it ſhould be obſerved, that Mr. Lightfoot dwells very much on the capillary branches, making them a part of his eſſential character.

### 58. FUCUS CONFERVOIDES.

F. frone filiformi ramoſâ, ramis ſub-diſtichis ſub-ſimplicibus ſetaceis; tuberculis lateralibus ſemi-globoſis. *Herb. Linn. Buddle, p.* 16. *n.* 12. *Petiver, p.* 30. *n.* 1.

*R. Syn. p.* 51. *n.* 3. *and p.* 50. *n.* 50. *Act. Gall.* 1712, *p.* 40. *pl.* 5. *f.* 9.

F. longiſſimus. *Gmelin, p.* 134. *t.* 13. *Fl. Dan. t.* 650.

F. confervoides. *Linn. Sp. Pl.* 1629.

F. verrucoſus. *Fl. Ang. p.* 588. *Withering, vol.* 3. *p.* 256. *Stackhouſe, Ner. Britt. p.* 26. *t.* 8.

F. flagelliformis. *Fl. Scot. p.* 928.

*Habitat*

*Habitat* in rupibus et ſaxis ſub-marinis apud Cromer in Norfolciâ—Haſtings Suſſexiâ, et in Inſulâ Portlandiæ.

*Radix* fibroſa—*Frons* cartilaginea, filiformis, teres, variat pro ſitu dodrantalis, etiam bipedalis; nunc fili emporetici minoris, nunc ſetæ equinæ craſſitiem æquans—Statim a radice ſit ramoſa, ramis ſetaceis, vel ſimplicibus vel ramulis paucis ſub-diſtichis inſtructis—*Fructificatio*, tubercula ſemi-globoſa crebra, magnitudine ſeminis ſinapis ad latera ramorum ramulorumque ſparſa—*Color* recentis plantæ purpuraſcens, ſiccatæ nigreſcens.

This ſpecies differs from *albidus* by being longer, by its branches being much fewer, and not attenuated towards the baſe—by the diſpoſition of its ramuli being diſtichous, and not on one ſide only of the branches—by having much more numerous and ſmaller tubercles, and theſe always ſemi-globoſe—and by its purpliſh colour. With the other ſpecies in this diviſion it cannot poſſibly be confounded.

It varies conſiderably in length and thickneſs. When unimpeded in its growth, it is ſlender, long, and very little branched. Where it is more confined, it is thicker, ſhorter, and throws out more branches; which has occaſioned it to be deſcribed by Dillenius, in *Ray's Synopſis*, twice at leaſt; his *n.* 53. *p.* 51. being certainly this ſpecies in its lengthened, and *n.* 50. *p.* 50. the ſame in its ſhorter ſtate of growth.

From comparing our ſpecimens with thoſe in the Linnæan Herbarium, it appears that both this plant, and our next, the *albidus* of Hudſon, were conſidered by Linnæus as one and the ſame plant, for they are both ſtyled by him F. *confervoides*. It is not therefore to be wondered at, that Linnæus refers to *verrucoſus* Gmel. for a figure of his *confervoides*, which figure of Gmelin, from his deſcrip-

tion more certainly than from his repreſentation, is F. *albidus* of Hudſon.

That it is the *longiſſimus* of Gmelin cannot be doubted, and it appears from the note at p. 134, that he himſelf thought it to be *conſervoides* Sp. Pl. though he did not venture to quote it as certain.

The colour is almoſt always dark purple, though ſometimes it is mixed with green or dirty yellow. The tubercles are ſmall, numerous, and nearly black. It adheres to the rocks and ſtones by ſmall fibres, and is found on various parts of the Britiſh coaſt.

### 59. Fucus albidus.

F. fronde filiformi ſubdichotomâ ramoſiſſimâ, ramis ſub-ſecundis; tuberculis lateralibus ſub-rotundis depreſſis.

F. verrucoſus. *Gmelin, p.* 136. *t.* 14. *f.* 1.

F. albidus. *Fl. Ang. p.* 588. *Withering, vol. 3. p.* 256.

*Habitat* in rupibus et ſaxis ſub-marinis in Inſulâ Portlandiæ—apud Chriſtchurch—Weymouth.

Adhæret rupibus et ſaxis radice fibroſâ—*Frons* ſpithamæa, pedalis et ultra, cartilaginea, filiformis, teres, ramoſiſſima, craſſitie fili emporetici, ſæpiùs autem ſetacea—*Rami* primarii frequenter dichotomi, nonnunquam ſparſi, ramulis crebris ſub-ſecundis, baſi attenuatis inſtructi; hi autem aliis ramulis brevioribus et tenuioribus obſiti—*Fructificatio*, tubercula variæ magnitudinis ad latera ramorum ramulorumque ſparſa, adprimum ſemigloboſa, matura autem depreſſa et paululum umbilicata, ſcutellis lichenum exinde ſimillima—*Color* albeſcens vel fuſceſcens, rariùs purpuraſcens, plerumque pallidus.

This ſpecies is diſtinguiſhed from *confervoides* by its ſhorter growth—by being more branched, the branches uſually pointing one way, and the ſmaller ones attenuated at their baſe—and by the larger ſize and different ſhape of the tubercles; which when mature are depreſſed and umbilicated, exactly reſembling the ſhields of ſome *Lichens.* From *purpuraſcens* it differs ſufficiently in having lateral tubercles, and, as before mentioned, its branches pointing one way. It is unneceſſary to point out any diſtinctions from the reſt of this diviſion.

The principal branches, which ſeparate almoſt immediately from the root, and generally in a dichotomous form, are in this plant furniſhed with very numerous ſecondary branches, growing moſtly from the upper ſide, and theſe are again beſet with ſmaller: theſe branches are always ſmaller towards the baſe; ariſing as it were from a point, and then ſwelling; and are again tapered towards the ſummit. The fructification has been fully deſcribed. The colour is generally whitiſh, but ſometimes with a tinge of brown or purple.

It is well deſcribed by *Gmelin, p.* 136; but the figure is not equal; the tubercles being repreſented too ſmall, and the twiſted appearance being probably the effect of drying. Mr. Hudſon has referred to *albus Gm. p.* 138, as well as to *verrucoſus*; but the former is deſcribed as having the tubercles all axillary, and muſt therefore be a different ſpecies. He alſo refers to *R. Syn.* 50. '*F. teres albus tenuiſſime diviſus,*' which is clearly *purpuraſcens*; the fructification being deſcribed as ſurrounding the branch, and not lateral, as in this ſpecies. We cannot find any ſpecies in Ray ſufficiently certain to be quoted.

It adheres by its ſtrong cartilagineous fibres to the rocks at Weymouth and Chriſtchurch, and elſewhere on the ſouthern coaſt;

and we have found it amongſt other rejectamenta on the beach at North Yarmouth.

### 60. FUCUS SUBFUSCUS.

F. fronde filiformi ramoſiſſimâ, ramis ſparſis, ramulis ſubulatis ſub-alternis; tuberculis racemoſis ſub-octoſpermis.

*Act. Soc. Linn.* I. *p.* 131. *t.* 12. *Withering*, *vol.* 3. *p.* 236.

*Habitat* in rupibus et ſaxis ſub-marinis in littore Icenorum.

*Radix* fibroſa—*Frons* filiformis, teres, ramoſiſſima, ſubfuſca, ſemipellucida, ſemipedalis, craſſitie fili emporetici—*Rami* ſimiles plurimi ſparſi; aliis paulò tenuioribus et apicem verſus confertis, iterum ramoſi—*Ramuli* ſubulati, ſub-alterni, tenuiſſimi; in quorum alis et ad latera, racemi breviſſimi, tuberculis minutiſſimis lanceolatis palliidis—In tuberculis ſingulis, ſemina ſex vel octo ſphæroidea ſubfuſca, bino ordine diſpoſita.

This ſpecies is ſufficiently diſtinguiſhed from all its affinities by its ſingular fructification; and as an ample hiſtory of it has been given in a former volume of theſe Tranſactions, little need be added here.

It may nevertheleſs be proper to obſerve, that later and more particular obſervations have induced us to conclude that the peduncle more conſtantly approaches the form of a raceme than that of a panicle, and that the extreme ramifications cannot with propriety be conſidered as leaves, ſince they do not differ in ſubſtance or in ſhape from the reſt of the plant. Theſe circumſtances have occaſioned it to be neceſſary, to make ſome alteration in the ſpecific character as formerly given, and to place it in the diviſion *fronde tereti*, inſtead of *foliis unitis*, as before propoſed.

It

It adheres, by ſhort thick fibres, to the ſub-marine rocks and ſtones at Cromer, and in various other parts of the Britiſh coaſt.

### 61. Fucus pedunculatus.

F. fronde filiformi pinnato-ramoſâ, ramis ſetaceis ſimplicibus ſub-diſtichis; tuberculis oblongis pedunculatis ſparſis.
*Fl. Ang. p.* 587. *Withering, vol.* 3. *p.* 256.

*Habitat* in rupibus et ſaxis Inſulæ Portlandiæ. *Fl. Ang.*—Inter rejectamenta maris apud Yarmouth in Norfolciâ.

*Radix*————*Frons* filiformis pinnato-ramoſa, teres, tenuiſſima, ſpithamæa, ſemipedalis, pedalis & ultra—*Rami* ſimpliciſſimi, ſetacei, ſub-diſtichi, inferiores longiores, ſuperiores breviores, ſupremi breviſſimi; cuncti tuberculis parvis oblongis ſparſis obſiti—*Tubercula* ſeminibus repleta, pedunculis ſibi æqualibus vel longioribus ſuſtentata—*Color* totius plantæ ex olivaceo-flaveſcens, pallidus.

This very elegant ſpecies is readily diſtinguiſhed from its ſeveral affinities: from *tenuiſſimus*, by being only ſimply branched, and by the form of its tubercles; and from *aſparagoides* alſo, by being ſimply branched, by its colour, and by not having ſetaceous ramuli alternating with the tubercles.

The branches in this ſpecies are entirely deſtitute of any other ornament than the ſeminiferous tubercles; and its extremely delicate and ſlender make, as well as its general habit, ſufficiently prevents the poſſibility of confounding it with any other in this diviſion.

It is a particular circumſtance belonging to this ſpecies, that we have rarely ſeen any ſpecimens which were not infeſted with a minute green conferva, growing on almoſt all the tubercles, and

terminating the branches, rarely exceeding one line in length. The plant, when infeſted with this paraſite, has a fringed appearance, and ſo extremely reſembles the *gærtnera* of Pallas, figured in his *Miſcell. Zool. p.* 199. *t.* 14. *f.* 24. and again in Gmelin, *p.* 164. *t.* 19. that we are induced to believe they are the ſame; but not chooſing to make any references, upon the authenticity of which we cannot abſolutely rely, we have not ventured to refer poſitively to thoſe figures.

We have never ourſelves ſeen this plant in a growing ſtate. Mr. Hudſon ſays it is found on the ſub-marine rocks and ſtones on the Iſle of Portland: and we have in our poſſeſſion ſpecimens which were gathered amongſt other rejectamenta on the beach at Yarmouth in Norfolk, and which were probably waſhed from the rocks on ſome part of the eaſtern coaſt.

### 62. FUCUS ASPARAGOIDES.

F. fronde filiformi ramoſiſſimâ; tuberculis globoſis pedunculatis, ramulis ſubulato-ſetaceis alternatim oppoſitis.

*Act. Soc. Linn.* 2. *p.* 29. *t.* 6.

*Habitat* in ſaxis et lapillis marinis apud Cromer.

*Radix* fibroſa—*Frons* filiformis, teres, craſſitie fili emporetici minoris, ſemipedalis, ramis ſub-alternis iterum ramoſis—Hi rami ramulis ſubulato-ſetaceis, ſeſquilineam circiter longis, pinnati ſunt—*Fructificatio*, tubercula globoſa, pedunculata, magnitudine ſemina papaveris vix æquantia, ramulis alternatim oppoſita, et duplo breviora—*Pedunculi* longitudine tubercula æquant vel exſuperant—*Color* totius plantæ lætè ruber.

This beautiful ſpecies cannot be confounded with any in the ſame diviſion,

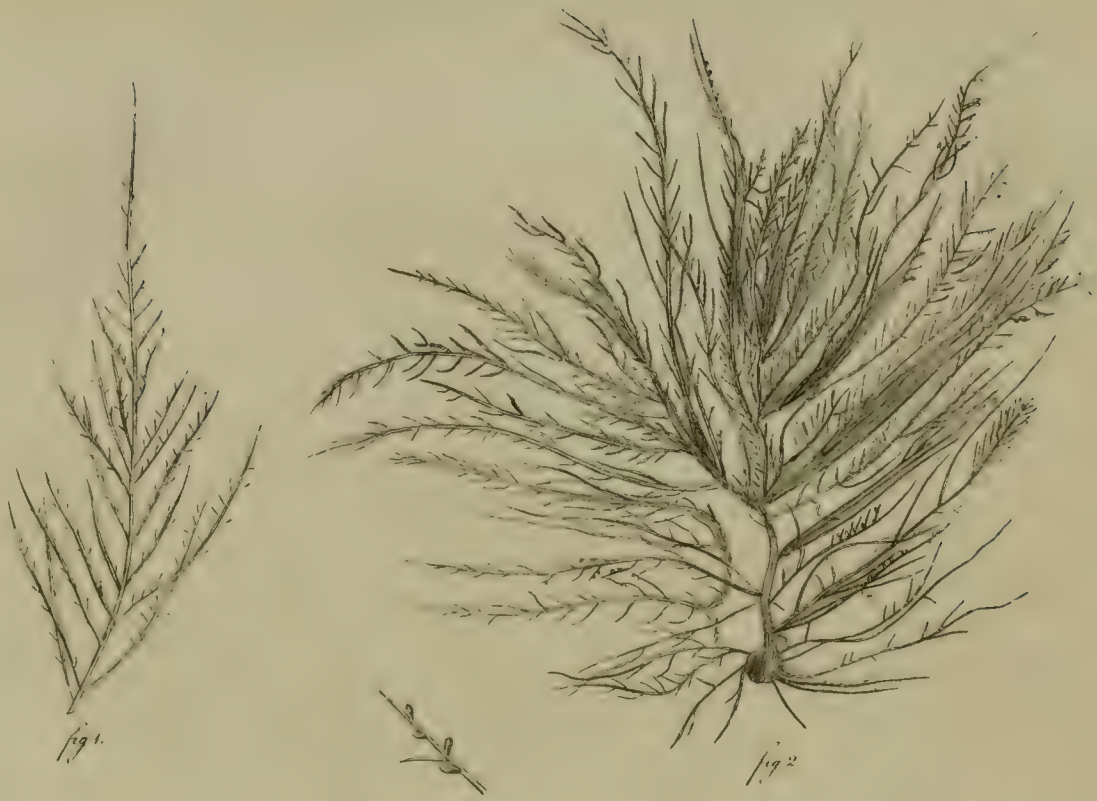


fig 1.

fig 2

*T. tenuissimus.*

M. & G. delin.

diviſion, unleſs *tenuiſſimus* and *pedunculatus*. It is eaſily diſtinguiſhed from the firſt, by its pedunculated tubercles, from the branches having a ſubalternate mode of growth, and by the colour. It differs from the ſecond, by being very much branched, by the ſhape of the tubercles, which alternate with the ſetaceous ramuli, and by the colour.

The whole plant is bright-red and pellucid. The tubercles, when filled with ripe ſeeds, are darker than the reſt. The ſetaceous ramuli, which are twice and ſometimes thrice as long as the tubercles with their peduncles, are ſo delicate, that the terminations are ſcarcely to be diſtinguiſhed by the naked eye.

It adheres by ſmall fibres to the ſtones and pebbles at Cromer; and has been found amongſt other rejectamenta on the ſandy ſhore at North Yarmouth.

### 63. Fucus tenuissimus. Tab. 19.

F. fronde filiformi ramoſiſſimâ, ramis omnibus capillaribus alternis, ramulis acutis tuberculatis.

Ulva capillaris. *Fl. Ang. p.* 571. *Withering, vol.* 3. *p.* 233.

*Habitat* in lapidibus et ſaxis ſub-marinis in Iſthmo Portlandico—necnon in Fucis majoribus, præcipuè F. *veſiculoſo* prope Weymouth, ſub Speculâ Anglicè *The Look-out* dictâ.

*Radix* fibroſa, ſurculoſa, unde frondes plurimæ ſimul enaſcuntur confertæ—Sæpe etiam frons ſolitaria oritur—*Frons* brevi poſt ortum intervallo ramoſa fit, ramis capillaribus alternis—Hi rami iterum in alios plurimos paucoſve pro re natâ abeunt—*Ramuli* extremi breves admodum, baſi et apice attenuati acuti—Omnes rami ramulique omnino alterni ſunt—*Altitudo* 2-uncialis, ſpithamalis, pedalis—*Subſtantia* tenera gelatinoſa—*Color* pallidus albidus—*Fructificatio*, tuber-

cula

cula conferta, ramulos omnes apiceſque ramorum obveſtientia—In unoquoque tuberculo ſemen unicum minutum obovatum, hinc acutum pallidum, poſt exſiccationem rubicundum. Occurrit, ſed rariùs, veſiculis globoſis ſeſſilibus, minutis.

We have been well aſſured that this plant is the *ulva capillaris* of Mr. Hudſon. The fructification, however, which we have repeatedly examined in a recent ſtate, under a very high magnifier, proves it beyond all doubt to be a *Fucus*. It has nothing in common with the genus *Ulva*, but its tender gelatinous ſubſtance. But this circumſtance is no generic character.

In its habit, form and manner, it approaches ſomewhat to F. *pedunculatus*; but it is ſufficiently diſtinct by being very ramoſe, and not ſimply pinnated, by the laſt diviſions of its branches being linear and acute at each end, and not in the form of ovate-oblong pedunculated capſules: then it is a much ſmaller plant, and is paraſitical, growing very frequent on the coarſer *Fuci*, particularly on F. *veſiculoſus*. The colour in both theſe plants is alike pale.

Leſt any one may imagine that there is any danger of confounding it with *aſparagoides*, it may be juſt mentioned, that the colour is always pale, and never red; and that it never has globoſe *pedunculated* tubercles, or any oppoſition to its branches.

In a recent ſtate the ſeeds are nearly of the colour of the branches; but, when dried, they ſeem to be of ſomewhat a reddiſh colour.

It may be found adhering to the looſe ſtones on the neck of the Iſle of Portland; and under *The Look-out* at Weymouth we found it plentifully on the coarſer *Fuci*, a little way beyond the low-water mark.

Its fine pale capillary branches (always alternate) make a pretty appearance floating in the water; and at once diſtinguiſh it from all others.

others. When growing on the looſe ſtones in the Iſle of Portland it is frequently infeſted with *Conferva æruginoſa.*

Little globular tranſparent proceſſes, reſembling bladders, ſometimes are to be found on the ſides of the finer branches, which we have deſcribed as covered with minute tubercles—ſometimes they adhere to the branches themſelves, and appear to contain minute ſeeds; but this appearance is by no means conſtant. It is incredible how the plant is diſguiſed when loaded, as it ſometimes is, with theſe veſicles. See FIG. 2.

Theſe proceſſes rightly obſerved might perhaps help to elucidate the mode of fructification in *Fuci.* Perhaps the tubercles (which Reaumur aſſerts are capſules) are ſcattered in duſty cluſters at firſt along the branches in an embryo ſtate, as is obſervable in *Hypoglóſſon, alatus, kaliformis,* &c. &c. and at length one or more (the reſt proving abortive) become fertile, and ſwell into complete form.

Theſe proceſſes appeared to us too ſeldom to deſerve admiſſion into the eſſential character. The finer ramuli uſually are to be obſerved ſurrounded with minute tubercles—each tubercle contains a ſeed obovate, and acute at one end.

### 64. FUCUS ARTICULATUS.

F. fronde membranaceâ filiformi-tubuloſâ concatenatim articulatâ ramoſiſſimâ, ramis uniformibus dichotomis verticillatiſque.

*Herb. Petiver, p.* 25. *n.* 5. *Buddle, p.* 12. *n.* 2. *Moriſon, Hiſt. Ox.* 3. *ſ.* 15. *t.* 8. *f.* 4. *Stackhouſe, Ner. Britt. p.* 28. *t.* 8. *a. b. Fl. Scot. p.* 959. *Withering, vol.* 3. *p.* 240.

Ulva articulata. *Fl. Ang. p.* 569.

*Habitat* in ſaxis, rupibus, tigniſque ſub-marinis, necnon in Fucis grandioribus Devoniæ et Cornubiæ.

*Radix* callus minutus vix expanſus—*Frons* 3—4uncialis, craſſitie fili emporetici, membranacea, tenera, filiformis, tubuloſa, omnino concatenatim articulata, ramoſiſſima—*Rami* primarii ſæpiùs dichotomi, aliis conſtanter verticillatis obſiti—*Ramuli* aut oppoſiti aut verticillati ſunt, ſupremi frequentiſſimè dichotomi—Plantâ fructificante, ramuli unarticulati folia ovalia mentientes verticillatim poſiti articulos ſupremos circumdant, ſeminibus minutis rubris repleti—*Color* pallidè ruber vel purpuraſcens, nonnunquam olivaceo-viridis.

This plant has been arranged amongſt the *Ulvæ* by Mr. Hudſon, but was removed to the genus *Fucus* by Mr. Lightfoot, the fructification according with that genus; and this arrangement we chooſe to follow, there being no certain limits to be drawn between the two genera of *Fucus* and *Ulva*, but ſuch as ariſe from the nature and ſituation of the fructification.

The jointed ſtructure gives this ſpecies ſome affinity with the *Confervæ*, but the fructification again clearly points out the impropriety of placing it in that genus.

The figure of Moriſon well expreſſes the habit of the plant. The principal branches are uſually dichotomous, and throw out, at intervals, whorls of ſomewhat ſmaller branches, uſually four or five in a whorl, which are again divided into ſmaller, ſometimes oppoſite, ſometimes verticillate; the terminations are uſually dichotomous. When in fructification, there are generally whorls of ſingle joints, reſembling oval leaves, ſurrounding ſome of the ſmaller branches; theſe perform the functions of tubercles, and contain numerous dark red ſeeds; and the ſame are alſo found in ſome of the terminating

nating joints. The colour is uſually pale red or purple, but ſometimes olive-green, and not unfrequently all are found intermixed in the ſame ſpecimen.

It is found on all parts of the ſouth and weſt coaſts, growing on the rocks, and on the larger and coarſer *Fuci*. We have alſo obſerved it on the wooden piles on the ſides of the pier at Weymouth, and elſewhere.

The F. *repens* of Mr. Lightfoot is only a variety, or perhaps ought ſcarcely to be called a variety, of this ſpecies. The colour is of a darker or purpliſh red, but the diſpoſition of the branches is much the ſame. As far as it has appeared to us, it may be deemed only the young or dwarf plant of *articulatus*.

### 65. Fucus Opuntia.

F. fronde cartilagineâ ſub-compreſſâ ſolidâ, concatenatim articulatâ, ramoſâ, ramis uniformibus dichotomis.

*Dill.* 50. *t.* 10. *f.* 9. A. B. C. D.

Ulva articulata β *Hudſ.* 569.

*Habitat* apud Tenby in Walliâ Auſtrali. *D. Stackhouſe.*

Adhæret rupibus callo minimo ſurculos emittente, unde oriuntur cæſpites denſi, rupes lichenum more obveſtientes. *Frons* vix uncialis rubra vel purpurea, nonnunquam paululum vireſcens, cartilaginea, articulata, ſub-compreſſa, ſolida, ramoſa. *Rami* dichotomi uniformes. *Articuli* ovales, quorum ſupremi tuberculorum officio funguntur, et ſeminibus minutiſſimis congeſtis fœti ſunt.

We have never had an opportunity of examining this little plant ourſelves on its native ſhores; but from the ſpecimens which Mr. Stackhouſe has been ſo obliging as to communicate, and to accom-

pany with very accurate obſervations, taken on the ſpot, we do not heſitate to deſcribe it as diſtinct from *articulatus*. It differs in the texture, which is cartilaginous and ſolid; in the form of the articulations, which are broader and ſhorter, in proportion to the ſize of the plant, and which are uſually compreſſed, though ſometimes they may be found filiform; in the diſpoſition of the branches, which in this are always dichotomous; and in colour, this being of a deep red or purple, whilſt *articulatus* is always pale, though both ſpecies are ſubject to have the upper joints tinged with green. The place and mode of growth are very different, *articulatus* growing not only on the rocks, but being very frequently paraſitical on the larger and coarſer *Fuci*, which are uſually ſubmerſed: *opuntia*, on the contrary, is always found on the naked, and often on the perpendicular rocks, between high and low water-mark. The frond adheres to theſe rocks by a ſmall callous knob, from which ſhoots ariſe, which, where they touch the rock, adhere, and throw out branches; thus forming large tufts, exactly in the manner of the *Lichens*. The branches are dichotomous, but never verticillated in the manner of *articulatus*; and in theſe, we apprehend, as well as the terminal ones, the ſeeds are to be found.

### 66. FUCUS VARIABILIS.

F. fronde filiformi ramoſiſſimâ, ramis ſubimbricatis, ramulis breviſſimis faſciculatis acutis.

F. confervoides. *Fl. Ang.* 591.

*Habitat* inter rejectamenta maris apud Yarmouth in Norfolciâ—apud Exmouth in Devoniâ, ſed rariùs.

*Radix* fibroſa ſurculos emittens, unde novæ oriuntur plantæ.

*Frons*

*Frons* ſemipedalis, filiformis, ramoſiſſima: *Rami* nonnunquam alterni, frequentiùs ſparſi et ſummitatem verſus imbricati: Ramuli breves, faſciculati capillares; in plantis junioribus acuti, at mox longiores et obtuſiuſculi fiunt. *Color* junioris plantæ flaveſcens, feneſcentis niger. Subſtantia in juniori plantâ ſubcartilaginea, tenera, lævis; in feneſcenti, rigida, fragilis, ſcabra.

This plant has been called by Mr. Hudſon *conſervoides;* but that appellation having been given by Linnæus to the ſpecies deſcribed in the *Fl. Ang.* by the name of *verrucoſus*, it has become neceſſary to give a new denomination to the preſent plant. We have adopted that of *variabilis*, as expreſſive of the changes it undergoes in the different ſtages of its growth, which are ſuch, that were it not for one leading circumſtance, which may be traced through all its changes, it would be almoſt impoſſible to recognize it in youth and age for the ſame ſpecies.

This marking feature conſiſts in the ſhort faſciculated acute *ramuli* which readily diſtinguiſh it from all other ſpecies, and which is conſequently made the principal diſtinction in the ſpecific character. Theſe *ramuli*, in the young plant, form ſomewhat cloſe *faſciculi*, are fine almoſt as a hair, and acutely terminated. As the plant advances, they appear of rather a ſtronger ſubſtance, and ſomewhat more ſpreading; and in age they become longer, though rarely exceeding two or three lines: they terminate obtuſely, and appear ſomewhat multifid, as deſcribed in *Fl. Anglica.*

The young plant is ſubcartilaginous, but ſmooth and tender: in age it becomes rigid, fragile, and peculiarly rough to the touch, from the remains of the broken branches and *ramuli.* From theſe circumſtances Mr. Hudſon has deſcribed it '*fronde ſcabrâ*,' and '*ramulis denticulatis*,' taking part of his ſpecific character very improperly

properly from appearances which are not at all warranted by the examination of the young and undamaged plants, and are ſolely owing to the approach of age and decay. The young plants are of a yellowiſh colour, and ſomewhat tranſparent; in age they become black and opake.

We have not met with it in a growing ſtate, but have found it, with all its varying appearances, amongſt the rejectamenta on the ſhore at North Yarmouth.

We have not yet had an opportunity of ſeeing it in fructification.

### 67. FUCUS PINASTROIDES.

F. fronde filiformi ramoſiſſimâ, ramulis arctè imbricatis ſubulatis ſub-ſecundis apice incurvatis integris.

*Herb. Buddle*, *p.* 18. *n.* 3. and *p.* 19. *n.* 4. *R. Syn. p.* 50. *n.* 46. *Gmelin*, *p.* 127. *t.* II. *f.* I.

F. incurvus. *Fl. Ang. p.* 590. *Withering*, *vol.* 3. *p.* 259.

*Habitat* in rupibus et ſaxis ſub-marinis paſſim.

*Radix* fibroſa—*Frons* filiformis, ſublignoſa, atro-rubeſcens, dodrantalis vel ſemipedalis, craſſitie pennæ corvinæ, ramoſiſſima—*Rami* ramulis denſiſſimè imbricatis, ſubulatis, rectiuſculis, incurvis et ſub-ſecundis veſtiti—*Fructificatio*, tubercula globoſa magnitudine ſeminis rapi, in ramulorum alis et ad latera, pedunculata et ſeſſilia.

This ſpecies, one of the leaſt elegant of the whole genus, is eaſily diſtinguiſhed from its affinities by its thicker and more woody ſtem, and its cloſely imbricated branches, which, towards the extremities, are thickened into a ſcarcely diſtinguiſhable maſs.

The whole ſtem, and the larger as well as the ſmaller branches,

 are

are covered with ſubulate *ramuli*; and though they ſurround every part, yet, as they all turn upwards, they have the appearance of growing from one ſide only.—Theſe are of various lengths, from one line to half an inch, and have frequently, when examined by a ſtrong light, eſpecially before they have been long expoſed to the air, and are become ſhrivelled, the appearance of joints or medullary *ſepta*, proving this plant to be nearly allied to the *Conferv*æ. The fructification is notwithſtanding certainly that of a *Fucus*.—It is found only amongſt the extreme branches, and conſiſts of globular tubercles, about the ſize of turnip-ſeed, moſtly axillary, and ſupported on peduncles about half a line in length, but ſometimes lateral; and, in this ſituation, both ſeſſile and pedunculated. The colour of the recent plant is dark red, but, when dry, it is entirely black.

It adheres by its fibrous baſe to the rocks, and is found upon almoſt every ſhore.

### 68. Fucus lycopodioides.

F. fronde filiformi ſub-ſimplici, ramis ſubulatis ſub-ramoſis undique imbricatis ſquarroſis.

*Linn. Syſt. Nat.* 717. *Retz. Fl. Scand. Prod. ed.* 2. *n.* 1696.

Conferva ſquarroſa. *Fl. Dan. t.* 357.

Inter rejectamenta maris apud Yarmouth in Norf. invenimus.

*Radix* callus minutus vix expanſus—*Frons* 6-uncialis et ultra, filiformis, craſſitie pennæ corvinæ, modò ſimplex, modò ramis perpaucis inſtructa, radicem verſus nuda, dein uſque ad apicem ramulis brevibus ſubulatis, obtuſiuſculis ſquarroſis ſubramoſis undique densè imbricata

bricata—*Subſtantia* cartilaginea rigida—*Color* recentis plantæ fuſceſcens, ſiccatæ niger—*Fructificatio* incognita.

This ſpecies, which was unknown to any of our Engliſh authors as of Britiſh growth, is one of thoſe in which the limits of the genera *Fucus* and *Conferva* too nearly approach each other; in conſequence of which it has been conſidered by the author of *Fl. Dan.* as a *Conferva*, though placed by Linnæus in the genus *Fucus*.

The *frond*, of which three or four generally ariſe from the ſame baſe, is about ſix or eight inches high, either ſimple, or throwing out a few ſhort branches, which are rarely again divided. The lower part, for about the ſpace of an inch, is always naked; but the whole of the remainder, to the ſummit, is cloſely imbricated with ſhort ſubulate branches, either ſimple or once divided, and terminating ſomewhat obtuſely. Theſe *ramuli* have frequently, but not conſtantly, a ſomewhat jointed appearance, which has occaſioned its being conſidered by Oeder as belonging to the genus *Conferva*. As nevertheleſs the ſtem is perfectly free from this appearance, and the rough and ſquarroſe habit of the plant accords better with the *Fuci*, and as it approaches conſiderably in habit and character to the *Fucus pinaſtroides*, which has alſo ſome of its extreme *ramuli* with a jointed appearance, we have thought it moſt proper to follow the authority of Linnæus, and arrange it as a *Fucus*.

The fructification has not yet been diſcovered, but will probably be found analogous to that of *Fucus pinaſtroides*, next in order to which we have placed it.

It has been found amongſt other rejectamenta on the beach at Yarmouth in Norfolk.

### 69. Fucus purpurascens.

F. fronde filiformi ramosissimâ, ramulis setaceis sparsis; tuberculis subrotundis innatis.

*Herb. Buddle.*

*R. Syn. p.* 50. *n.* 51. *Fl. Ang. p.* 589. *Withering, vol.* 3. *p.* 259.

F. tuberculatus. *Fl. Scot. p.* 926.

*Habitat* in rupibus et saxis sub-marinis ubique.

Adhæret saxis fibris aliquot crassiusculis—*Frons* filiformis, teres, cartilaginea tenera, pedalis et ultra, crassitie pennæ corvinæ, continua; ramis nunc oppositis, nunc alternis, plerumque autem sparsis instructa—*Rami* inferiores longiores, supremi brevissimi; ramulis numerosissimis sparsis, nonnunquam etiam confertis tenuioribus vestiti—Ramulis per intervalla innata sunt tubercula subrotunda seminifera a se invicem distantia—*Color* purpurascens, aut ex purpureo et virescenti-albescens.

This species differs from all its affinities by its fructification, which consists of roundish, or sometimes oval swellings, placed at some distance from each other on the smallest branches, and which, when the plant is mature, may be observed to be filled with blackish purple seeds. These are never terminal, as described by Gmelin; for, when they appear to be so, there may always be observed a subulate process, which is, in fact, the extremity of the branch extended beyond the tubercle.

The fructification of this plant is truly an innate tubercle, which occupies the central part of the branch, and, as it swells, causes that to dilate, and to form the gouty knot which is externally observable. The substance of the branch is no ways altered by this

proceſs, as may be eaſily ſeen in the gelatinous variety, which is uſually of a pale colour, and has a conſiderable degree of tranſparency.

The ſubſtance of the plant, though cartilagineous, is tender, and in ſome ſpecimens very much approaching to gelatinous. The principal ſtem is continued throughout, and is generally naked for a ſmall ſpace at the baſe, after which it is thickly clothed with branches, of which thoſe below the middle are longeſt, and the upper very ſhort, giving a lanceolate outline to the whole frond. The primary branches are ſometimes oppoſite and ſometimes alternate, but much more frequently grow without order—theſe are again once or twice branched, and the terminal ones are not unfrequently crowded. The colour is ſometimes wholly purple, but more frequently a mixture of dirty white, green, and purple; and the more the plant approaches to being gelatinous, the leſs purple is to be obſerved in it.

That this is the ſpecies deſcribed in *R. Syn. p.* 50. *n.* 51. under the name of '*Fucus teres albus tenuiſſime diviſus*,' no one who reads the deſcription there given can doubt, ('*crebris ſæpe nodulis donatur*, '*quæ non ad latus hærent, ſed ab ipſis cauliculis tranſadiguntur*') though Mr. Hudſon has unaccountably referred this ſynonym to his *albidus*, the fructification of which he deſcribes as lateral. Gmelin, following the firſt edition of *Flora Anglica*, has given this ſynonym of Ray to his *albus*, in which he has fallen into a double error; for not only the ſynonym really belonged to his *purpureus*, the *purpureus* of Hudſon's firſt edition, and *purpuraſcens* of the ſecond, but alſo the *albus* of *Fl. Ang. ed.* 1. the *albidus* of the ſecond edition, ought not to have been referred by Gmelin to his *albus*, but to his *verrucoſus*, as Mr. Hudſon has rightly done in his ſecond edition. There can be no doubt but the *purpureus* of Gmelin belongs to this ſpecies, though his

his deſcription is not perfectly clear; and we have never obſerved the blackiſh ſpots with which it is there ſaid the whole plant is ſprinkled.

Mr. Lightfoot deſcribed his *tuberculatus* as being branched directly from the root; and we have in our poſſeſſion a Scottiſh ſpecimen which agrees with that deſcription, but have never obſerved any Engliſh ones anſwerable thereto. This may poſſibly be Ray's '*Fucus teres rubens ramoſiſſimus*,' though, for want of the fructification being deſcribed, it is impoſſible to aſcertain whether that be *conſervoides* or a variety of this ſpecies.

It is found adhering to the ſub-marine rocks and ſtones on almoſt every part of the Britiſh coaſt.—The *var.* β, deſcribed by Mr. Lightfoot, we have never yet ſeen.

### 70. Fucus amphibius.

F. fronde filiformi ramoſiſſimâ, ramis alternis; ramulis capillaribus, apice involutis tuberculatis.

F. ſcorpioides. *Gm. p.* 135. *R. Syn. p.* 38. *n.* 4. *t.* 2. *f.* 6. *Fl. Ang. p.* 590. *Withering, vol.* 3. *p.* 260.

β Ramis craſſiuſculis, erectiuſculis.

*Habitat* in rupibus, ſaxis ſub-marinis, et ad radices plantarum in foſſis et paluſtribus maritimis frequens. *Hudſon.*—Inter rejectamenta maris apud Yarmouth in Norfolciâ legimus—β prope Exmouth in com. Devon.

*Radix* fibroſa—*Frons* gregaria cartilaginea, filiformis, teres, uncialis vel ſeſquiuncialis, craſſitie ſetæ porcinæ, ramis alternis patentibus—*Ramuli* capillares breviſſimi alterni, patentes; ſupremi incurvi, tuberculis mucilaginoſis ſeminiferis involutis—*Color* ex fuſcovireſcens.

This curious little plant is ſufficiently diſtinguiſhed from all in this diviſion by its humble growth, and its peculiar fructification.

The ſpecimens which we have ſeen of our firſt variety have rarely exceeded an inch in height: the primary and ſecondary branches are alternate, very much ſpreading; the extreme branches abſolutely capillary, generally alternate, but not unfrequently dichotomous, and, in this caſe, forming very obtuſe angles. The extremities are rolled ſpirally, and uſually include in their convolutions either ſingle or aggregate mucilaginous tubercles.

The figure in *R. Syn.* very accurately repreſents this plant; but *Pluk. Phyt. t.* 47. *f.* 13, quoted by *Gmelin*, does not at all reſemble any ſpecimens which have fallen under our obſervation. We have therefore omitted to refer to it, convinced that nothing tends more to confound the unpractiſed botaniſt, than references to erroneous or doubtful figures.

Our ſecond variety, whether from its adhering to larger ſubſtances, or enjoying a more fertilizing ſpot, or from the mere effect of age, is much larger, oftentimes above two inches high; the main branches alſo are larger and coarſer, and the finer branches not ſo capillary or divaricating. However, the eſſential character, viz. the convolution of the tips of the finer fruit-bearing branches, is equally conſpicuous in this as in our firſt variety.

### 71. FUCUS PLICATUS.

F. fronde filiformi dichotomâ ramoſiſſimâ æquali, ramulis ſubſecundis; tuberculis lateralibus terminalibuſque.

*Herb. Buddle, p.* 11. *Petiver, p.* 27. 1. 2. *R. Syn. p.* 45. *n.* 26. *Pluk. Phyt. t.* 184. *f.* 2. *Gmelin, p.* 142. *t.* 14. *f.* 2. *Fl. Dan. t.* 408. *Fl. Ang. p.* 589. *Fl. Scot. p.* 929. *Withering, vol.* 3. *p.* 258. *Stackhouſe, Ner. Brit. p.* 23. *t.* 7.



*Habitat*

*Habitat* in rupibus et ſaxis ſub-marinis paſſim.

*Radix*————*Frons* cartilaginea filiformis, teres, ramoſiſſima, purpuraſcens vel flaveſcens, dodrantalis, craſſitie chordam muſicam minorem æquans, a baſi uſque ad apicem æqualis—*Rami* confertiſſimi, implicati, incurvi, ſub-ſecundi; terminales conſtanter dichotomi—*Fructificatio*, tubercula minutiſſima ad latera et ad apices ramorum atro-purpurea.

This ſpecies is ſufficiently diſtinguiſhed from all its affinities by its numerous and thickly matted branches, which do not vary in ſize from the baſe to the extremities. The colour varies, purple and waxen; and frequently both are mixed in the ſame plant. The ſubſtance is cartilaginous and wiry, extremely brittle when dry.

The fructification, which was unknown to Gmelin, is deſcribed by Lightfoot as conſiſting in minute tubercles, growing without order on the ſides of the branches. We have, beſides theſe, obſerved the extremities of the branches dilated into ſimilar tubercles—both are ſo ſmall as ſcarcely to be diſtinguiſhable with the naked eye. The whole plant is diaphanous, except the tubercles when filled with ſeeds. It is found on various parts of the Britiſh coaſt, but is rarely met with in fructification.

### 72. Fucus byssoides.

Fronde ſub-quadripinnatâ, ramis ramuliſque omnibus alternis, primariis longiſſimis, ultimis breviſſimis faſciculatis tenuiſſimis.

*Habitat* inter rejectamenta maris in Inſulâ Sheppey, apud Haſtings, Weymouth, Exmouth, et alibi—haud infrequens.

*Radix* fibroſa—*Frons* tenera diaphana, filiformis, ramoſiſſima, ſub-quadri-

quadripinnata, ramis ramuliſque omnibus alternis—*Rami* primarii longiſſimi tenues admodum, etiam capillares—*Ramuli* ultimæ diviſionis tenuiſſimi breviſſimi faſciculati—*Fructificatio*, tuberculum minutum ramulos nonnunquam terminans ſæpius laterale—Ad omnem fere rami ramulive ortum geniculum eſt, unde confervis nimium affinis—*Color* amœnè ruber—*Altitudo* biuncialis—pedalis.

It muſt be allowed that this plant has all the habit and appearance of a *Conferva*. All the branches ſeem jointed. But two remarkable occurrences deſerve notice—Firſt, that theſe joints are obſervable only where there is a branch, or where one has iſſued forth—and, ſecondly, that a parenchymous dark line ſeems to run up the thicker branches, and that this joint often ends in the parenchymous line, and does not always paſs through the whole ſubſtance to the oppoſite ſide. This by no means accords with the nature of a *Conferva*, whoſe joints are annular ſtrictures, and equally viſible on all ſides. As, therefore, the joints are not at regular diſtances, nor always complete and perfect, there is certainly much room to doubt to which family it moſt properly belongs. We muſt beg leave to call upon thoſe who have better opportunities, to watch it in its different ſtates, and determine upon ſurer grounds.

When firſt thrown up on the ſhore, it is of a beautiful red colour, perfectly capillary. All its branches are alternate. The main ſtem or ſtems (for ſometimes there are more than one) run up to the length oftentimes of nearly a foot, ſometimes not above two inches. The branches of the firſt order are ſomewhat long, thoſe at the baſe longeſt, gradually diminiſhing in length towards the top. The branches of the ſecond order are ſhort, obſerving the ſame gradation, in point of length, as the former. Thoſe of the

other orders are *extremely* ſhort, uſually much crowded together in cluſters. The whole frond is very tender and tranſparent. In drying it often aſſumes a dark or black red colour.

It ſeems to be a paraſitical plant, as its root appears uſually altogether entangled in a maſs of ſome fine *Conferva*, matted like the *C. bulloſa*. It is by no means an uncommon plant.

It is very rarely to be met with in fructification. The fructification is very minute, ſeſſile tubercles, containing ſeeds, ſituated at the ends, and on the ſides of the ſmaller branches. We have ſeen ſome *Confervæ* with ſimilar appearances *.

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WE have thus endeavoured to make out as complete a catalogue of the Britiſh ſpecies as our preſent means and opportunities have enabled us to aſcertain. We have had to wait year after year for the appearance of fructification in ſome ſpecies which rarely occur in that ſtate. Some few have never yet appeared to us with any ſign of flower or tubercle at all. *F. ligulatus* and *tomentoſus*, in particular, are extremely equivocal in this reſpect. But from ſome late communications from Mr. Stackhouſe, we have reaſon to expect that the fructification of *tomentoſus* will not long remain concealed.

* In our Synoptic Table we have called this plant *Fucus capillaris*, upon a ſuppoſition that Mr. Hudſon had deſigned this plant under that denomination. But ſince the printing of that part, Sir Thomas Frankland, Bart. F. R. S. has honoured us with ſome very valuable communications. Among other things he has ſent us ſpecimens of Hudſon's real *capillaris*, and has aſſured us that this is *Conferva Byſſoides* of Mr. Lightfoot's MSS. We have therefore adopted that trivial name. But we differ from Mr. Lightfoot, in aſſociating it with the genus *Fucus*, for reaſons above mentioned. It is too late now to avail ourſelves of Sir Thomas Frankland's remarks; but theſe and other matters, which have come to our knowledge ſince the concluſion of this tract, will be the ſubject of a ſupplementary paper.

This

This gentleman, fortunately ſituated near the Corniſh coaſt, perhaps the moſt prolific in *Algæ* of any part of the Britiſh ſhore, is purſuing, with unremitting ardour, the inveſtigation of the phyſiology of the marine plants; and, from the diſcoveries he has already made, expectations may be formed that ſome very valuable ones reſpecting this deſideratum, may be obtained from his reſearches.

While, therefore, we are preſenting our liſt of ſpecies, ſo far from deeming it or wiſhing it to be thought complete, we beg leave to profeſs how conſcious we are of imperfection, and how fearful we are of many important omiſſions. We have only to conſole ourſelves that we have ſpared no pains in inveſtigating, and faithfully deſcribing every thing within our reach. Hence we flatter ourſelves that we have added ſomewhat to the general ſtock of knowledge upon this ſubject. We muſt add, that we have received from Mr. Stackhouſe ſpecimens of three or four undoubtedly new ſpecies of *Fucus*; but as he is engaged in an excellent work on this ſubject, part of which he has already publiſhed under the name of *Nereis Britannica*, we did not think ourſelves authoriſed to anticipate his publication by deſcribing thoſe ſpecies. We ſhall endeavour hereafter to incorporate them into our ſyſtem.

One great ſource of difficulty, in executing this treatiſe, took its riſe from the very great miſtakes which appear in authors of the firſt reſpectability. Thus Mr. Hudſon had arranged our *Fucus tenuiſſimus* amongſt his ſpecies of *Ulva*, and had called it *Ulva capillaris*. He had made F. *inflatus*, a plant of the diviſion *Alati*, to be a variety of his *Ceranoides*, the *Criſpus* of Linnæus, one of the diviſion *Fronde planâ aveniâ*. Theſe and numberleſs errors of the like kind we detected, partly by waiting for ſpecimens in proper fructification, partly by conſulting the Linnæan Herbarium, now, fortunately

fortunately for ſcience, in the poſſeſſion of our worthy Preſident Dr. Smith; and partly by having recourſe to Sir Joſeph Banks's kind indulgence; without whoſe favour, and free leave to conſult his extenſive collection of books and ſpecimens, how could this, or indeed how can any tract of labour and difficulty hope to boaſt of tolerable perfection?

We want words alſo to expreſs our high ſenſe of Her Majeſty's moſt gracious condeſcenſion, in not only permitting Dr. Goodenough to conſult Mr. Lightfoot's collection of plants, which ſhe purchaſed upon his death; but, with the moſt attentive kindneſs, in directing every paper which could furniſh him with any information to be ſubmitted to his peruſal; and even perſonally aſſiſting and encouraging him. When ſuch elevated rank deigns to add encouragement to ſcience, gratitude is not wanting, nor a due ſenſibility of the goodneſs of the act; neither is it poſſible that labour, however ſevere, ſhould ſink into wearineſs—all is ardour, and happineſs, and promptitude, and reſpect, and duty.

Much was gained by this conſultation. It was found that Mr. Lightfoot's *ſpiralis* was the true plant of Linnæus; his *diſtichus* the *ceranoides* of Linnæus; his *ceranoides* the *criſpus* of Linnæus; his *ceranoides* var. *δ lacerus* (which is a variety of Mr. Hudſon's *canaliculatus*.—How do the learned differ!) our *mammilloſus*; his *concatenatus*, the ſame as Mr. Hudſon's plant of that name, the *fœniculaceus* of Linnæus; his *eſculentus* comprehends both our ſpecies *tetragonus* and *teres*; his *rubens* our *ſinuoſus*; his *endiviæfolius* the *criſpatus* of Hudſon, our *laceratus* var. *criſpatus*; his *nereideus* our *corneus* var. *filicinus*, the *filicinus* of Mr. Hudſon; and his *vermicularis* perfectly diſtinct from Mr. Hudſon's *ovalis*. Mr. Lightfoot's F. *verticillatus* unfortunately had been miſlaid, ſo that no opportunity offered of proving that ſpecies from his original ſpecimen. This defect has

been ſupplied by ſeveral of our friends and correſpondents, particularly by our worthy and accurate friend the Rev. Hugh Davies, F. L. S. of Aber near Bangor, by whoſe aſſiſtance we have been enabled to determine it to be our *kaliformis*.

Mr. Hudſon was our chief guide in enumerating the ſpecies. But we could not follow him altogether. His having added no deſcriptions to his equivocal plants, leaves us extremely in the dark concerning his real determination. Theſe doubts, in conſequence of the loſs of his herbarium, cannot now be cleared up. Some ſpecies we know are not exiſting. His F. *filiformis* muſt be ſuſpected to be our compreſſed variety of *criſpus*, only of a larger and more robuſt form. His *fimbriatus* is our fringed variety of *membranifolius*; his *ſetaceus* is merely *fibroſus* in a young ſtate, in which the leaves are perfectly ſetaceous; his *volubilis* is a twiſted variety of *veſiculoſus*; the *volubilis* of Linnæus is not of Britiſh growth: his *pinnatifidus* and *multifidus* are one and the ſame plant, named only after the different forms it aſſumes from the different accidents of its growth and ſtation; his *corneus*, *pinnatus*, and *filicinus*, are alſo varieties only of one individual; his *cartilagineus* appears, from his quoting Buddle, evidently to be our *coronopifolius*, not the *cartilagineus* of Linnæus; his *furcellatus* the *lumbricalis* of Gmelin, not the real Linnean plant; his *muſcoides* a variety of *aculeatus*, with the branches ſomewhat round; and his *lanoſus* is the *Conferva polymorpha*. Theſe two laſt we have accordingly ſtruck out of our liſt entirely.

With all due deference to Major Velley and Dr. Withering, we have omitted their F. *elminthoides* and *defractus*, the fructification appearing to us, from the few ſpecimens which we have ſeen, to be that of the genus *Ulva*. It is with much diffidence that we diſſent from them; we flatter ourſelves that we are all actuated

by

by one common ſpirit of reſearch after truth, and purſue it with equal diſintereſtedneſs. As we have endeavoured to fix a true generic character for *Fucus*, *Ulva*, and *Conferva*, we wiſh to abide by our own rules.

Whatever we have ſaid in this tract, we again beg may be brought to the teſt of the cloſeſt examination. Particularly we wiſh that gentlemen of ſcience reſorting to the ſea-ſide, and eſpecially thoſe who are reſident on it, would omit no opportunity of examining the growth of marine plants, their various appearances, and the progreſs of the parts of fructification. We are confident of nothing, but that we have ſtated what we have actually ſeen. In a ſubject ſo intricate as this, it would be highly adviſable that all prejudices, and all compariſons and ideas of analogy taken from plants growing on land, ſhould be entirely laid aſide. This firmneſs of thinking led to a better illuſtration of the natural orders of the genera, by the indefatigable Juſſieu; to a deeper inveſtigation of the nature and properties of the ſeed, by the celebrated Gaertner; and of the moſſes, by the illuſtrious Hedwig. Why ſhould it be thought impoſſible, that the ſubmarine plants, like the animals of that element, ſhould have powers and properties new, original, and peculiar to themſelves? The power of God is over all his works, and is ſeen, to the aſtoniſhment of man, in the variety of his wonders. But what can equal the ſatisfaction which he muſt feel, to whoſe patient and unwearied obſervation the diſcovery of this hitherto latent proceſs ſhall be made manifeſt? What labour would not be well repaid by the diſcovery of another chain of reaſoning, leading us to a farther confirmation of the exiſtence and operations of the eternal Godhead?

XX. *Description of Ulva punctata. By John Stackhouse, Esq. F. L. S.*

*Read May* 5, 1795.

ULVA PUNCTATA.

ULVA dichotoma, membranacea, diaphana; segmentis latis, uniformibus, apice furcatis; fructificatione globosa, sessili, in maculis oblongis per totam frondem glomeratim dispositа.

*Sp. nov.*

An inter *Ulvas* vel *Fucos* annumeranda sit species hæc, haud equidem, ut opinor, satis liquidò constat. *Altitudo* sexuncialis; *latitudo* segmentorum vix uncialis: apices obtusi, furcati. *Habitus* dichotomus. *Substantia* frondis tenuissima, pellucida. *Fructificatio* per totam frondem ordine bino, glomeratim dispositа: tubercula singula, rotunda, glabra, sessilia, atro-rubentia. *Frons* enervis, e basi tuberculata, subtus plana, saxis adhærenti exoritur.

*Hab.* ad oppidum Weymouth in arena juxta portum.

*Dotted Ulva.*—Frond dichotomous, membranaceous, transparent: the divisions wide, uniform, bluntly forked. Fructification in patches; tubercles crowded, round, smooth, without footstalks, dark-red colour.

*Observations.*

*Obſervations.*

The ſubſtance of this rare plant is as thin as goldbeaters' ſkin, or the membrane of *Ulva umbilicalis*. It ariſes from a little knobby root, flat at bottom; and grows in a crowded maſs. It is perfectly dichotomous, the ſegments broad, of an equal ſize, forked obtuſely. Its colour is brown, and pellucid as a bladder. The fructification covers the whole frond, in two rows of oblong patches, ſtudded thick with ſmall, round, dark-red granules. This plant has, I believe, never been noticed; it is, probably, a native of deep waters, and, from the delicacy of its texture, ſeldom thrown on ſhore perfect. Mr. Woodward, who has ſeen the ſpecimen, thinks the fructification too regular, as to ſituation on the frond, for the genus *Ulva*; otherwiſe it would fall under his diviſion of Fruit-bearing *Ulva*.

*Hab.* Thrown on ſhore on the ſands at Weymouth, near the pier, at low-water mark, September 1792.

XXI. *Ob-*

XXI. *Obſervations on the Genus of Porella, and the Phaſcum cauleſcens of Linnæus. By Mr. James Dickſon, F. L. S.*

*Read May* 5, 1795.

THE genus of *Porella*, firſt eſtabliſhed by Dillenius, and from him copied by Linnæus, who never ſaw the plant, had long appeared to me to be very doubtful: I had, however, an opportunity, ſome time ago, of ſatisfying myſelf on this ſubject. I happened to receive ſome moſſes as package to plants from America; and, upon examining them, found a *Jungermannia* and a *Splachnum* in fructification. I ſuſpected the *Jungermannia* to be the ſame with the *Porella* of Dillenius; but this could not be aſcertained without actually comparing the two ſpecimens, which I had an opportunity of doing by the indulgence of Dr. Sibthorp, of Oxford, who permitted me to compare my moſſes with Dillenius's original collection; and, upon the moſt careful examination, I found my *Jungermannia* to agree exactly with his *Porella*, but could find no fructification upon his ſpecimen.

As I have no doubt that my *Jungermannia* and his *Porella* are one and the ſame plant, I ſhall next endeavour to trace how Dillenius has fallen into this error; for the plant has exactly the habit of a *Jungermannia*.—This was, probably, by receiving an imperfect ſpecimen; as the vagina, when damaged either by the weather or by inſects, after the tender flower had fallen off, would very much reſemble the capſule which he has figured.

His figure of the plant is too much crowded with leaves; but in his original drawings in the poſſeſſion of Sir Joſeph Banks, the

Linn. Trans. XII. tab. 20. p. 236

fig. 1

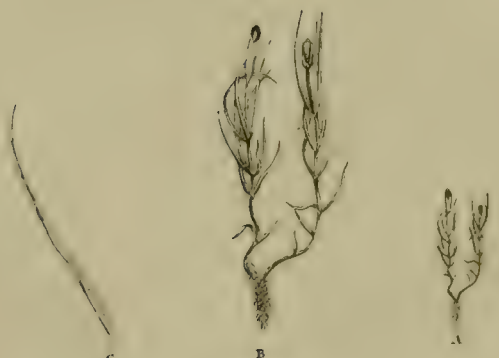


fig. 2

leaves, ſo far as they are repreſented, are placed in the ſame manner as in the annexed figure.

I ſhall now ſubjoin a ſhort deſcription of it under the name of

JUNGERMANNIA *porella.* Tab. 20. Fig. 1.

J. ſurculis pinnatis ramoſis medio floriferis, floribus ſubſeſſilibus, vaginis obovatis inflatis.

*Habitat* in Pennſylvania.

DESCR. *Surculi* decumbentes ramoſi. *Folia* alterna, obovata, perforata, pellucida, ſubtus auriculata. *Vagina* ſubpedunculata inflata, exiguis aliquot ad baſin ſquamis cincta. *Seta* breviſſima.

The *Splachnum* which I received at the ſame time with the above, when compared with Dillenius's ſpecimen, proved to be the *Sphagnum* figured in Tab. 85. f. 15.;—the figure is remarkably ſtiff. This is made a *Phaſcum* by Linnæus; but with equal impropriety, it being a true *Splachnum.*

SPLACHNUM *cauleſcens.* Tab. 20. Fig. 2.

Spl. cauleſcens, foliis linearibus apice ſetaceis.

*Habitat* in Pennſylvania.

DESCR. *Caules* filiformes erecti; *folia* alterna, inflexa, reticulata, pellucida; *capſula* erecta cylindrica.

EXPLANATION OF TAB. 20.

Fig. 1. A Jungermannia porella; natural ſize.
B ——— ——— capſule magnified.
C ——— ——— part of the plant magnified.

Fig. 2. A Splachnum cauleſcens; natural ſize.
B ——— ——— magnified.
C ——— ——— a leaf magnified.

XXII. *De-*

## XXII. *Deſcription of the Ribes ſpicatum. By Mr. Edward Robſon, A. L. S.*

*Read July 7, 1795.*

### Ribes spicatum. Tab. 21.

RIBES inerme, ſpicis erectis, petalis oblongis, bracteis flore brevioribus.

*Habitat* in ſylvis. Near Richmond in Yorkſhire, and between Pierſbridge and Gainford, in the county of Durham. ♄. v.

### Descript.

*Frutex* erectus, 4 ſeu 5 pedalis.

*Caulis* inermis, ramoſiſſimus.

*Rami* alterni erecti.

*Cortex* fuſco-cinereus.

*Folia* alterna, erecto-patentia, petiolata, ſubcordata, triloba quinquelobaque, rugoſa, inæqualiter ſerrata; ſerraturis lobiſque acutis: ſupra ſubglabra, ſubtus tomentoſa, juniora tomentoſiora, inodora.

*Petioli* ſubteretes, foliorum longitudine.

*Spicæ* ſolitariæ, laterales numeroſæ, erectæ, bracteatæ, 1—1½ pollicem longæ.

*Flores*

– Linn. Trans. III tab. 21 p. 240.

*Flores* numeroſi, ſeſſiles, patentes, 2—3 lineas lati, ad ſummum ſpicæ conferti.

*Bractea* ſubter florem, germine brevior, ovata, concava, apice reflexa.

*Calyx. Perianthium* monophyllum, ſemiquinquefidum, laciniis cuneato-ſubrotundis, erecto-patentibus, rubido-fuſcis præter margines ſubvirides.

*Corolla. Petala* quinque, cuneato-oblonga, erecto-patentia, minuta; calyci inter ſingulas diviſuras inſerta.

*Stamina. Filamenta* quinque erecta, corollæ longitudine, calyci inſerta, et ejus laciniis oppoſita. *Antheræ* triloculares.

*Piſtillum. Germen* ſubrotundum, inferum, glabrum.
*Stylus* bifidus, ſtaminum longitudine.
*Stigmata* obtuſa.

*Pericarpium. Bacca* globoſa, laciniis calycis coronata, unilocularis; colore et guſtu R. *rubro* ſimilis.

*Semina* ſubrotunda (5—10) fibris baccæ affixa.

### *Obſervationes.*

Non attentè ſpectantibus, *ſpicatum* et *rubrum*, dum nondum ſe pandunt, magnam inter ſe ſimilitudinem habere videntur; ſin autem oculis intentis ſcrutentur, patefactum fit, plus illud foliorum prono tomentoſum, ac ſerraturis lobiſque acutum, quam hoc, eſſe —Cum vero floreſcunt, *ſpicatum* a *rubro*, quod illius rubido-fuſci, hujus ſunt flores luteolo-virides, at etiam ejuſdem generis adhuc repertis, quod illud ſpicis erectis ornatum eſt, differt.

XXIII. *Observations on the Insects that infested the Corn in the Year* 1795. *In a Letter to the Rev. Samuel Goodenough, LL. D. F. R. S. Tr. L. S. By Thomas Marsham, Esq. Sec. L. S.*

*Read May* 3, 1796.

DEAR SIR,

TOWARDS the end of July last, a friend of mine (Mr. Long) who had the management of a farm in Hertfordshire, was telling me that an insect had made its appearance among the wheat, which threatened to do much mischief; that it was found, in many instances, to have attacked one, two, or more grains in an ear; and that it was discoverable by those grains appearing yellow, or as it were ripe, while all the remaining grains in the same ear were perfectly green.—I desired that gentleman to bring me up some of the diseased ears, which he did; and I found them exactly as he had described them.—On opening those grains that seemed diseased, I found in many of them an orange-coloured powder, and in several, one or two very minute *larvæ*, differing in colour, from a yellowish white to a deep yellow. They were too minute for examination by the naked eye; but by applying a deep magnifier I perceived them to be the *larvæ* of a small *musca*, and to resemble very much those aphidivorous *larvæ* that produce one particular family of the *muscæ*. They were thick at one end, and gradually diminished to a point at the other, where the head was situate. They extended and contracted themselves at pleasure; to which was added

added a leaping motion, frequently jumping full half an inch from the paper on which I examined them. The grain where theſe inſects had poſſeſſion appeared a little ſhrunk. Beſides theſe *larvæ*, I frequently met with the *Thrips phyſapus* running about between the huſks, and alſo ſeveral very ſmall *Ichneumons*, one of which ſettled upon a *larva* while under my glaſs; and I ſaw it repeatedly wound the little maggot with its tube, and I have no doubt it depoſited its eggs. This was ſeen alſo by Mr. M'Leay, F.L.S. who was examining them with me.—I placed this wheat in water, and Mr. Long continued to ſupply me with freſh ears every week; and alſo, at my requeſt, tied ſome gauze round ſeveral of the diſeaſed ears, while growing in the field, which ſtood until the corn was ripe; but I was not able, with all my care, to diſcover the fly produced from the before-mentioned *larva*. Anxious, however, to determine, if poſſible, the hiſtory and progreſs of this little animal, which now ſeemed to create univerſal alarm; and knowing that my various avocations would prevent my quitting London; I had written, on the firſt hearing of the inſect, to ſeveral of my friends who reſide in the country, and to you among the reſt, requeſting their particular attention to this ſubject, and the reſult of that application I now give you.—From the obſervations you were enabled to make, you will remember that you had obſerved only the *Thrips phyſapus*, which you concluded to have been the inſect, if it was an inſect which did the miſchief, although you could not diſcover any material injury that had occurred.—From our truly valuable friends Wm. Markwick, Eſq. of Catsfield, near Battle, and the Rev. Wm. Kirby, of Barham, of whoſe accuracy and attention to this ſubject we have both received very convincing proofs, I received the following accounts.

Mr. Markwick, in his letter of the 9th of Auguſt, ſays: "I repaired immediately to my wheat fields on receiving your letter,

" and gathered ſuch as I thought appeared to anſwer beſt to your " deſcription of diſeaſed ears, and brought them home for inveſ- " tigation. From your account of the deſtructive properties of this " little inſect, I expected to find it buried in the very heart of the " grain, after having eaten its way thither; but, to my great ſatiſ- " faction, no ſuch thing has yet occurred; and, from what I have " hitherto obſerved, I have great doubt with reſpect to its *deſtructive* " *properties.* This opinion may perhaps ſurpriſe you; and my own " future obſervations, as well as thoſe of your more ſkilful and " learned friends, may poſſibly prove me in an error; but my rea- " ſons for thinking ſo at preſent are, that when in the field the crop " appeared to be very fine, and I had great difficulty in finding any " ears that I ſuppoſed to be diſeaſed. In ſome few ears I found the " inſect lodged between the huſks or outward ſcales of the *calyx*; " nay, even in thoſe where I found the inſect, the grain itſelf did " not appear to have received any injury, only the huſk ſeemed " rather diſcoloured. I think I have diſcovered this little inſect " both in the *larva* and *chryſalis* ſtate; but it is ſo minute, that I " will not be poſitive whether what I took for the *chryſalis* was not " a dead inſect. I have placed all that I have yet found in an open " box, along with ſome ears of wheat, and covered it with fine " gauze, to prevent the fly, or perfect inſect, from eſcaping, when it " comes forth. If I ſhould be ſo fortunate as to ſucceed in this, " or can make any further obſervations towards inveſtigating the " natural hiſtory of this little animal, you may depend on hearing " from me again. It is with great pleaſure that I can, I believe " with truth, inform you, that our wheat in general is very fine " this year, the grain large and full, and a proſpect of its yielding " well when it comes to be threſhed."

In a letter dated Oct. 1, 1795, the ſame gentleman adds, " I was " in hopes that I ſhould have been able to trace the minute inſect

" which was lately found in the ears of wheat, through all its " changes; but am ſorry to ſay that my reſearches have not been " attended with that ſucceſs I could wiſh. I have never met with " it in the ſtate of a ſmall *white larva*, as you deſcribe it to be at " firſt. But whenever I have ſeen it, its firſt ſtate was a very ſmall " *caterpillar* or *larva*, of a bright yellow colour, which had neither " legs, antennæ, nor wings (See tab. 22, fig. 1 and 2), and which " changes into an egg-ſhaped *chryſalis* of the ſame colour (See tab. " 22, fig. 3 and 4.).

" In my former letter to you, I ſpeak of this *larva* as being found " only between the outer huſks or ſcales of the *calyx*. But this is " not always the caſe; for I have ſince found it between the *corolla* " and the grain, and even on the grain itſelf; but amongſt the vaſt " number of grains which I have examined, I could never clearly " diſcover that this inſect had eaten into any of them. I have fre- " quently found it ſitting on fine full grain, which did not appear " to be injured in the leaſt. Sometimes indeed I found it on grain " that was blighted, or ſhrivelled; but even then I could not diſ- " cover that it was eaten by the inſect. In thoſe ears where I " found theſe inſects (to the number, perhaps, of two or three, " ſeldom more, in one ear), the grains were in general full, and not " eaten at all. In one ear, containing 33 grains, I found four of " theſe inſects, three of them on one ſingle grain; yet neither that, " nor any of the other grains in the ſame ear, was eaten in the " leaſt. In ſhort, from all that I have been able to obſerve, I am " perſuaded that the wheat has received no damage from theſe very " minute inſects; for, being ſo minute, they muſt abound in im- " menſe numbers to do any material miſchief, even ſuppoſing them " to feed on the grain; neither of which is, I believe, the caſe: " for their numbers were, comparatively ſpeaking, ſmall; in moſt

" of

" of the ears which I examined, none at all. And when I did find " them, there were but few, and theſe few had not, that I could " diſcover, fed on or injured the grain. Since the harveſt has been " got in, I have found the ſame inſect in the huſks of the wild " bearded oats *(avena fatua)*, but have not yet ſeen it in its fly or " perfect ſtate. Should that happen from the *chryſalides* in my " poſſeſſion, you ſhall hear from me again.—Amongſt the ears of " wheat I found ſeveral ſmall black flies (as they appeared to me), " and imagined that they were produced from the above-mentioned " ſmall yellow *chryſalides*; but on conſulting our very accurate " friend Dr. Goodenough, he convinced me that this ſmall black " fly was the *Thrips phyſapus* of Linnæus; and that a ſmall yel- " lowiſh tranſparent inſect, with 6 legs and 2 antennæ (found " alſo amongſt the wheat), was its *larva* (See tab. 22, fig. 5, 6, " 7, 8)."

Mr. Kirby's communication to me on this ſubject was in a letter dated Auguſt 27, 1795, wherein he ſays—" You aſk me " to make enquiries concerning the inſect which has infeſted " the *wheat* this ſummer: what follows is the reſult of thoſe " enquiries, which I hope will give you ſatisfaction. Before I " had received your letter I had paid ſome ſlight attention to the " ſubject, being informed of the circumſtance by ſome intelligent " neighbours; but your requeſt added a ſtimulus to my endeavours, " and I flatter myſelf that the reſult of my reſearches will prove " clear and ſatisfactory. I had from the firſt ſuſpected the inſects " to be the *Thrips phyſapus*, a ſpecies very common every ſummer, " and, after the cloſeſt inveſtigation, my ſuſpicions are turned into " conviction. I examined a great number of ears, and in them " found this inſect in all its ſtates, between the *interior valve* of the

" *corolla*

" *corolla* and the grain. It takes its ſtation in the longitudinal fur-
" row of the ſeed, in the bottom of which it ſeems to fix its roſtrum;
" probably ſucks the milky juice which ſwells the grain, and thus
" by depriving it of *part*, and in ſome caſes perhaps the *whole*, of its
" moiſture, occaſions it to ſhrink up, and become what the farmers
" in this part of the world call *pungled*. If your correſpondent in
" Hertfordſhire means the ſame inſect, he is miſtaken in aſſerting
" that only a ſingle grain in an ear is injured by it. I have myſelf
" ſeen ears in which a *fourth part* of the grain was deſtroyed, or
" materially hurt.—I have frequently ſeen two of the inſects upon
" a ſingle grain, and am told that ſometimes more are obſerved.
" What is ſingular, when I met with them on the grain in the
" *imago* ſtate, they were often in *pairs*, one of which was *apterous*.
" Theſe I take to be the ſexes. I once found a large ſpecies *ano*
" *aculeato* (*Thrips aculeata* Muſ. Kirby) in which the ſame diſtinc-
" tion takes place. The *larva* of *Thrips phyſapus* is yellow, has ſix
" legs, which, with the antennæ and head, are black and white.
" Sometimes it is all yellow. It is very nimble in its motions, and
" although brought away in the grain, ſoon makes its eſcape.—
" The *pupa* is whitiſh, with black eyes, and wings apparent. It is
" very ſlow and ſluggiſh in its motions. The *imago* it is needleſs to
" deſcribe; it is ſo like itſelf in every ſtate, that it is impoſſible to
" miſtake it. There was an orange-coloured powder in every grain
" in which the inſect was found, which I imagine is its excrement.
" All the farmers that I conſulted reſpecting it agreed in ſaying
" that it did moſt miſchief to the *late* ſown wheats, and that ſuch
" as were ſown early received little or no injury. This I think very
" probable; for when the grain is arrived at a certain degree of
" hardneſs and conſiſtency (which perhaps was the caſe with the
" early ſown wheats, before the inſect made any material attack),
" I ſuppoſe

" I ſuppoſe it is not liable to be hurt. Linnæus ſays of this inſect, " '*Spicas ſecales inanit*,' but nobody ſeems to have apprehended the " injury it is capable of doing to wheat. An intelligent farmer, " who firſt pointed it out to me, aſſured me that he was firmly " perſuaded that it was this inſect which occaſioned what was calle! " the blight laſt year, which was the cauſe of ſo defective a crop. " The part of one field that I examined, and which was particu- " larly injured, was to the north of a high edge; but the above- " mentioned farmer informed me that he had found them plentiful " in a very *open* country. To me they appeared more injurious in " the *heavy* than in the *light* lands. Laſt year the bearded wheat " (called by our farmers *clog-wheat*) eſcaped with the leaſt injury; " but this year, as far as my information and obſervation went, " it was the moſt injured. I obſerved in one or two inſtances " the *Forficula auricularia* upon the ear; and upon examining the " grain, each time, to which it had applied itſelf, I found upon it " the *Thrips*. Query:—Does it not devour them? Gmelin has a " ſpecies of *Thrips* under the name of *Thrips rufa* (*Gmel. Syſt. tom.* i. " *pt.* 4. *Thrips* 10.) from a German writer (*Gleichen, Neueſtes im Reiche* " *der Pflanz.*), which I ſuſpect to be the *larva* I have been deſcribing, " or perhaps the *pupa*, which he ſays '*habitat in tritici ſpicis*,' and " adds, with a query, '*An forſan larva minutiſſimæ?*' The only me- " thod which can be ſerviceable to prevent the ravages of this " inſect is, to ſow the wheat early. It is probable that it does con- " ſiderable damage *every* year, as it is a very common inſect. Nor " do I imagine it has been more injurious than uſual in the preſent " year, only the ſcarcity has excited people's attention to every " thing that might hurt the grain. I found three other diſtinct " inſects, in the *larva* ſtate, upon the wheat, but in no quantity; two " of which eſcaped me, but one I had an opportunity of deſcribing.

" *Larva*

" *Larva* citron-coloured, without feet, head acute, tail truncated, " margined with a plicato-papilloſe margin; length three-fourths of " a line. This ſpecies I found between the corolla and the grain.— " Of the other two, the one was lodged in the kernel, and the other, " which was a long (about five lines) hexapod, very ſwift, devoured " it with extreme voraciouſneſs. This is all I have been able to " collect upon this ſubject; and I wiſh it may prove ſatisfactory to " you and the Linnean Society, and ſerviceable to the public. We " cannot help reflecting, on this occaſion, what ſeemingly ſmall and " inſignificant creatures may, in the hand of Divine Providence, " become the cauſes of the moſt alarming viſitations; and, if allowed " to increaſe to a certain pitch, almoſt of the deſtruction of the hu- " man race."

From the obſervations and accurate inveſtigation of my friends above mentioned, it ſhould appear, that very little damage to the wheat is to be dreaded from the havock of the inſects they have deſcribed. It is, indeed, rather unfortunate that none of us could ſucceed in breeding the fly, which the ſmall larva, remarked by us all, is deſtined to produce.—From Mr. Kirby's letter, and the remarks of the farmer, the *Thrips phyſapus* is the inſect that is ſuppoſed to do the miſchief; and this ſeems confirmed by the great Linnæus, and alſo by Gleichen (in a French work on the microſcope) quoted by Gmelin, and to ſuch authorities it is with the utmoſt diffidence I hazard a contrary opinion. I cannot, however, help ſtating that opinion, being perſuaded that the attachment of this minute inſect to the grain ariſes from the grain being firſt in a diſeaſed ſtate, of which the orange-coloured powder, called by many farmers the *red gum*, ſeems a proof. For this powder, you informed me, was not the excrement of an inſect (as I had ſuppoſed), but the farina or ſeed of a ſmall *Lycoperdon* of Linnæus, or *Æcidium*

of later authors, which attaches itſelf to decayed leaves, &c. The *Lycoperdon* itſelf is very minute, and before its burſting has the appearance of a flattiſh, ſmooth, irregular, yellow exudation, or gum*. The firſt ſtep towards putrefaction, either in plants or animals, is a well-known invitation to numerous kinds of inſects; and therefore the ſhrinking of the grain, or the abortion, alluded to by Linnæus when he ſays *Thrips phyſapus* "*ſpicas ſecales inanit*," may have ariſen from ſome other cauſe than the depredation of inſects.—Gleichen, who was in ſearch of microſcopic objects, and conſequently turned his attention to the ſingular and elegant ſtructure of the various parts of minute inſects, does not mention that the ſmalleſt injury was done to the grain by the *Thrips*, which, he ſays, "*habitat in tritici ſpicis*," and he figures ſeveral other ſpecies found on different flowers. That wheat is not the only plant on which the *Thrips phyſapus* is to be met with, muſt be evident to every entomologiſt; for it is ſcarcely poſſible to gather any flower during the whole ſummer, and even in the ſpring, without finding it in numbers; particularly the compound flowers of the *Syngeneſia* claſs, ſuch as the *Leontodon Taraxacum*, on which I have always found them in the greateſt numbers in their three ſtates. Beſides, I am not quite ſatisfied that this inſect, notwithſtanding its very minute ſize, is not carnivorous, as moſt if not all the *Cimices* and other hemipterous inſects are. The minute *larva* of the *Muſca* has alſo that appearance; and, I am in-

* This opinion ſeems confirmed in a ſenſible, well-written letter, in the Gentleman's Magazine for Auguſt 1795, page 627, ſigned A. O. O. which I have but very lately ſeen. The writer's ſentiments ſeem entirely to coincide with mine on this ſubject.—In the ſame Magazine and page, another writer, under the ſignature C. takes notice of the larva of the Muſca, and the ſmall Ichneumon fly, of the former of which he has added a tolerable figure: but although the body of the fly conveys ſome idea of the animal, yet the antennæ and legs bear no reſemblance to any inſect. This fly, which he miſtakes for the parent of the larva, is moſt aſſuredly its enemy, as I have mentioned in the firſt part of my obſervations.

clined

Linn. Trans. III. tab. 22 p. 251

clined to think, feeds even on the *Thrips*, which has been one principal reaſon why we could not breed it.—Mr. Kirby, indeed, mentions that one of two inſects which he ſaw, beſide thoſe particularly deſcribed, was devoured voraciouſly by the other, which was a hexapod, and therefore very probably a *Thrips*, or at leaſt an hemipterous inſect. The *Forficula auricularia*, which Mr. Kirby alſo met with on the wheat, I preſume, from many obſervations I had an opportunity of making about two years ſince, is not carnivorous, having ſeen it devour various ſpecies of culinary plants with great avidity. Its time of feeding is about midnight.

Having communicated to Sir Joſeph Banks my thoughts on the ſubject of theſe inſects, he ſhewed me, and kindly permitted me to make uſe of an elegant drawing (See tab. 22. fig. 9—12) which he had directed to be made from ſome wheat ſent him from Yorkſhire. This drawing ſeems to open a new field in the entomological ſcience.

Fig. 9 repreſents a ſpicula of the *Triticum hybernum* of its natural ſize.

Fig. 10 is a flower expanded, and highly magnified.

A. A cluſter of the little larvæ before deſcribed, much magnified, that had taken up their reſidence in the corolla.

B. The ſtamina of their uſual ſize.

C. The ſtyles, ditto.

D. The germen ſcarce at all ſwelled.

Fig. 11. The germen nearly complete, as it appeared in the other flowers of the ſame ear.

Fig. 12. The larva magnified.

It is curious to obſerve that the parts of fructification remained unhurt much beyond the uſual time, although the fruit was not produced.

XXIV. *Descriptions of Actinia crassicornis and some British Shells.* *By John Adams, Esq. F.L.S.*

*Read June 7, 1796.*

IN addition to the former paper on minute shells, which the Linnean Society did me the honour of receiving, I beg leave to lay before them the result of some observations made since the writing of those remarks.

ACTINIA *crassicornis.* A. rubra, cirris conico-elongatis. *Syst. Nat. Gmelin.* 3132. *Dicquem, Ph. Tr. vol.* lxiii. *t.* 16. *f.* 10. *and t.* 17. *f.* 11. *Baster opusc. subs.*

A. senilis. *Syst. Nat. ed.* 12. *p.* 1088.

Milford Haven.

*Obs.* All the specimens I have seen have been of a pale colour, marked with spots of a deep red colour.

TELLINA *maculata.* T. testa subovata crassiuscula, decussatim striata, maculis irregularibus—*Species nova.*

Tenbigh.

*Obs.* It is remarkable in this species, that although the figure of the spots in different specimens is

quite diſſimilar, yet in both the upper and under ſhell they are perfectly ſimilar.

VOLUTA *pallida.* V. teſta integra oblongo-ovata, ſpira elevata, columella quadruplicata. *Syſt. Nat. Gmel. p.* 3444.

Bulla cylindracea. *Da Coſta, Brit. Conch. page* 31. *p.* 2. 1. 7. 7.

Tenbigh.

Mr. Da Coſta is certainly miſtaken in conſidering the ſhell figured by him as the *Bulla cylindracea* of Mr. Pennant's *Br. Zool. vol.* iv. *p.* 70. *f.* 85. The figures above quoted are not indeed accurately finiſhed, but are, nevertheleſs, ſufficiently diſtinct to ſhew, that it is the ſame ſhell with the figures referred to by Linnæus for his *Voluta pallida*, viz. *Adanſ. Sen. t.* 5. *f.* 2. *falier*, and particularly *f.* 3. *ſimeri*, which accords very accurately with my ſpecimen. His deſcription is, however, very good, and enables me to aſſert, that it is the true *V. pallida* of Linnæus.

From the *Bulla cylindracea* it differs in the following particulars: 1. In having an evident ſpire. 2. In its plicated columella. 3. In having a beautiful poliſh, which the true *B. cylindracea* is entirely devoid of.

TURBO *canaliculatus.* T. quinque anfractibus longitudinaliter canaliculatis, apertura ſubrotunda.

Minute. Sea-ſand. Linny Bay.

*Obſ.* Pel-

*Obſ.* Pellucid, whitiſh, the ſpires fluted, and ſeparated by an elevated line.

TURBO

*diviſus.* T. quatuor anfractibus, lævibus et ſtriatis; apertura ſubovali.

Minute. Sea-ſand. Linny.

*Obſ.* Colour white, pellucid, each ſpire divided into two parts. The upper one ſmooth, the lower one ſpirally ſtriated.

HELIX

*tomentoſus.* H. teſta umbilicata, tribus anfractibus ſetoſis.

Boggy ground.

*Obſ.* Colour of horn, pellucid, beſet with ſhort briſtles which give the appearance of downineſs. Aperture roundiſh.

*fulgidus.* H. tribus anfractibus apertura, marginata rotunda.

Minute. Sea-ſand. Linny.

*Obſ.* Variegated with white and bronze, pellucid, within perlaceous.

SORPULA

*ſulcata.* S. duobus anfractibus, profundè ſpiraliter ſulcatis.

On the roots of the *Fucus digitatus.*

*Obſ.* Colour greeniſh.

XXV. *Bo-*

XXV. *Botanical Characters of ſome Plants of the Natural Order of* MYRTI. *By James Edward Smith, M.D. F.R.S. P.L.S.*

*Read October* 4, 1796.

THE natural order of MYRTI, *Juſſ. Gen.* 322, is compoſed of a number of very elegant ſhrubs and trees, the *genera* of which have not been clearly defined; nor, indeed, do the limits of this family ſeem well underſtood by the beſt writer on natural orders, M. de Juſſieu.

Theſe plants agree in having an arboreſcent ſtem, the wood of which is generally hard, and of ſlow growth. Their leaves are ſimple, for the moſt part entire, and evergreen; often dotted with clear reſinous ſpots, and almoſt always more or leſs aromatic, ſometimes aſtringent. *Calyx* monophyllous, urceolate, or tubular, with ſeveral, generally five, teeth, the body of the calyx being permanent, and inveſting the fruit (in ſome inſtances pulpy), though the teeth are very frequently deciduous. *Petals* equal in number to the teeth of the calyx, alternate with them, and inſerted into the rim juſt within them. *Stamina* inſerted into the ſame rim within the petals, numerous, rarely only equal to the petals in number, or about twice as many; for the moſt part very long, but, in ſome inſtances, ſhorter than the corolla. *Germen* in the bottom of the calyx, ſimple. *Style* one. *Stigma* undivided. *Fruit* either a berry

berry or capſule, formed of the body of the calyx, or inveſted with it, conſiſting of one or more cells, each cell containing one or more ſeeds. White is the prevailing colour of the flowers. I know no inſtance of an inclination to blue.

Such is the general idea of the order: there are, however, ſome exceptions. *Eucalyptus* of L'Heritier, and *Calyptranthes* of Swartz, have no proper petals, but in their ſtead a ſimple *operculum*, or cover. *Philadelphus* has a deeply divided ſtyle, as well as dentated, deciduous leaves; in *Decumaria*, and *Eſcallonia* alſo, the leaves are not entire. This laſt, and two other genera (*Bæckea* and *Memecylon*) with which M. de Juſſieu was not practically acquainted, he has placed in his preceding order of ONAGRÆ, becauſe they have ſtamina definite in number, that is, as many, or, at moſt, twice as many, as the teeth of the calyx. But I am perſuaded, if he had ſeen all theſe, he would have defined his order of MYRTI ſo as to admit them, which is ventured upon in the character given above.

It is not my preſent intention to treat of every genus in this family, nor even to enumerate them all. The difficulty of arranging ſome beautiful kinds from New South Wales firſt led me to ſtudy the order, and to theſe I ſhall principally confine my remarks. They belong to the following 9 genera.

1. Imbricaria. *Jungia of Gærtner.*
2. Bæckea *of Linnæus.*
3. Leptoſpermum *of Forſter.*
4. Fabricia *of Gærtner.*
5. Metroſideros *of Banks and Gærtner.*
6. Melaleuca *of Linnæus.*
7. Myrtus *of all authors.*
8. Eugenia *of Micheli, Linnæus, and Juſſieu.*
9. Eucalyptus *of L'Heritier.*

The

The order in which I have now enumerated them accords, as nearly as can be, with their natural affinity to each other; but they belong to various claſſes in the artificial ſyſtem of Linnæus, according to which I ſhall now give their generic characters.

## 1. IMBRICARIA.

Jungia. *Gærtn. Sem. v.* 1. 175. *t.* 35. *f.* 5.

PENTANDRIA *Monogynia*, next to *Eſcallonia*.

CHAR. GEN. *Petala* 5. *Stigma* capitatum. *Capſula* calyce tecta, bilocularis, polyſperma.

Gærtner ſuſpected this might not be a diſtinct genus from the *Eſcallonia* of *Linn. Suppl.* which he had never ſeen. But it differs eſſentially in having a capſule inſtead of a berry, not to mention many other particulars. See *Plant. Ic. ex Herbario Linnæano*, *tab.* 30 & 31.

In the unripe germen Gærtner found 2 cells, but of theſe one is often abortive. This is an inſtance, among many others, of the propriety of conſidering the fruit in an early ſtate, when we form generic characters, as the natural number of the parts is often moſt certainly to be learned in that ſtate. By this rule, the *Linociera* of Schreber will, if I miſtake not, be found not diſtinct from *Chionanthus*.

Gærtner mentions two ſpecies of his *Jungia*, of which I have received one from New South Wales—that repreſented in his plate. In my ſpecimens, the upper leaves, calyx, and petals, are crenate, which he has not expreſſed, but which is an additional mark of its affinity to *Eſcallonia*, the leaves of which are more or leſs ſerrated;

an unuſual circumſtance in this natural order. I have alſo another not mentioned by him.

With reſpect to the name, there being already a plant of a very diſtinct genus inſcribed to *Jungius* in the *Supplementum Plantarum* of Linnæus, it becomes neceſſary to give this of Gærtner another denomination. Profeſſor Gmelin has, indeed, called it *Mollia*; but, as I am ignorant of the derivation of that name, I purpoſely change it. However eſtimable this writer may be in other branches of ſcience, he can claim no rank as a botaniſt. The miſtakes pointed out by Mr. Dryander in the ſecond volume of our Tranſactions, and by M. Lamarck in thoſe of the Natural Hiſtory Society at Paris, are but a ſmall part of his innumerable errors. Perhaps no book in any ſcience contains ſo many. The zoological part of his *Syſtema* is far leſs faulty. In that department he may be conſidered as authority, till ſome original author appears; but good-nature would wiſh to forget his attempts in Botany. I cannot help upon this occaſion recommending, that only original authors in Natural Hiſtory ſhould have any authority to give permanent names. By original authors I mean thoſe who have ſeen and examined every object which they profeſs to deſcribe or enumerate, in contradiſtinction to compilers of the obſervations or nomenclature of others.

In preference therefore to *Mollia*, this genus is named *Imbricaria*, in alluſion to its imbricated foliage. A farther reaſon for my choice of this name is to aboliſh the *Imbricaria* of Gmelin, taken up by him from Juſſieu, which I know from original ſpecimens to be the identical *Mimuſops Kauki* of Linnæus, of which Juſſieu, after Commerſon's manuſcripts, made a diſtinct genus on account of its fruit having eight cells, and as many ſeeds; but Commerſon obſerved, that four or more of theſe were often abortive; and, on the other hand,

hand, Rumphius tells us the *Mimuſops* has often as many as three or four perfect ſeeds. It is probable, therefore, that the germen has eight cells and eight ſeeds, moſt of which are generally abortive; another inſtance of the neceſſity of ſtudying that part in all its progreſſive ſtates.

The ſpecies of *Imbricaria* are:

1. IMBRICARIA *crenulata*, foliis obovato-cuneiformibus apicem verſus crenulatis, petalis calycibuſque denticulatis.
   Jungia imbricata. *Gærtn. loc. cit.*

2. I. *ciliata*, foliis triquetro-linearibus calycibuſque ciliatis, germine pentagono.

To theſe might be added the *tenella* of Gærtner, which not having ſufficiently examined, I for the preſent omit. All are natives of New Holland, or New South Wales.

## 2. BÆCKEA *Linn.—Juſſ. Gen.* 321.

OCTANDRIA *Monogynia*, near *Fuchſia* and *Ximenia*.

CHAR. GEN. *Petala* 5. *Calyx* 5-fidus. *Capſula* tri- vel quadrilocularis, polyſperma, calyce tecta.

Juſſieu firſt formed any tolerably juſt conjectures concerning the natural family of this genus, to which the deſcriptions of Linnæus and Oſbeck by no means lead; nor, indeed, could it have eaſily been referred to the myrtle tribe, without the increaſed knowledge of that order which we have derived from the plants of New Holland. There is no doubt, however, that *Bæckea* belongs to the MYRTI, and not to the ONAGRÆ of Juſſieu, having the cloſeſt

affinity in character, habit, and aromatic qualities, to *Leptoſpermum*; from which it differs only in having but eight ſtamina, inſtead of a large indefinite number, which in this order is a ſufficient generic diſtinction; eſpecially as the number is very conſtant in all the flowers I have examined of the Chineſe, as well as the New Holland, ſpecies, though I have not often found two of the ſtamina (as Linnæus deſcribes them) ſhorter than the reſt.

1. BÆCKEA *frutescens*, foliis oppoſitis muticis, dentibus calycinis membranaceis coloratis.
   B. fruteſcens. *Linn. Sp. Pl.* 514. *Oſb. Reſa*, 231. *t.* 1. *Voyage*, *v.* 2. 373. *t.* 1.
   B. chinenſis. *Gærtn. Sem.* 157. *t.* 31.

Diſcovered in China by Oſbeck.

2. B. *denſifolia*, foliis quadrifariam imbricatis obtuſis mucronulo reflexo, dentibus calycinis foliaceis.

Sent from Port Jackſon, New South Wales, by Mr. White.

3. LEPTOSPERMUM *Forſt. Gen.* 36. *t.* 36. *fig. f—l. Juſſ. Gen.* 323. *Gærtn. Sem. t.* 35.

ICOSANDRIA *Monogynia*, after *Philadelphus*.

CHAR. GEN. *Calyx* 5-fidus, ſemiſuperus. *Petala* 5, unguiculata, ſtaminibus longiora. *Stigma* capitatum. *Capſula* 4- vel 5-locularis. *Semina* anguloſa.

To this genus naturally belong many ſhrubs which were referred by Dr. Solander to *Philadelphus*, and appeared under that genus.

genus in the *Hortus Kewenſis.* Forſter confounded with them, under the name of *Leptoſpermum*, another moſt diſtinct genus, the *Metroſideros* of Banks and Solander. Gærtner firſt ſeparated all theſe, and really underſtood the genus of which we are now treating, though he did not find out its genuine eſſential character, the capitate ſtigma, which (as well as the ſhortneſs of the ſtamina) clearly diſtinguiſhes it from *Metroſideros*. With *Philadelphus* it has no reſemblance in habit, nor ſcarcely any botanical characters in common. The excellent Dr. Solander would certainly never have referred theſe plants to that genus, had he examined the common *Philadelphus* itſelf, which is clearly and ſtrikingly diſtinguiſhed by its more or leſs deeply quadrifid ſtyle and ſimple ſtigmas, without adverting to the broad baſe of the petals, or the differences pointed out by Gærtner in the fruit. Even Tournefort's figures ſhew the characters above mentioned, though the ſtyle is commonly more deeply divided than he repreſents it, inſomuch that the flowers have often actually four ſtyles. Duhamel deſcribes them ſo, giving a very incorrect repreſentation of theſe ſtyles, with capitate ſtigmas (which ought to be ſimple), by the ſide of his copy of Tournefort's figure, to which his has as little reſemblance as can well be.

The younger Linnæus and Profeſſor Schreber have confounded *Leptoſpermum*, as well as *Metroſideros*, with *Melaleuca*, with which the latter of the two only has any great natural affinity. Dr. George Forſter has fallen into the ſame error in his *Prodromus* publiſhed in 1786.

The ſpecies of *Leptoſpermum* are much leſs eaſy to define than its generic character. Many of them are to be ſeen in the Engliſh gardens, and ſeveral have often flowered. The following attempt to characteriſe ſuch as are diſtinctly known to me, may ſerve till we have more light upon the ſubject; there being ſeveral more ſpecies

cies in the gardens, which I have not yet ſeen in ſufficient perfection to diſcriminate them.

1. LEPTOSPERMIUM *ſcoparium*, foliis ovatis mucronatis obſoletè trinerviis, calycibus glabris; dentibus membranaceis coloratis.
   L. ſcoparium. *Forſt. Gen. N.* 6.
   L. ſquarroſum. *Gærtn. Sem.* 174. *t.* 35.
   Melaleuca ſcoparia. *Linn. Suppl.* 343. *G. Forſt. Prod.* 37.
   Philadelphus ſcoparius. *Ait. Hort. Kew. v.* 2. 156.

This is the moſt commonly cultivated ſpecies, and flowers continually. I have received it from the garden of Meſſrs. Lee and Kennedy, by the name of *Philadelphus floribundus*, along with three other ſpecimens, which I ſuſpect to be varieties of this. They were called P. *rubricaulis*, P. *rubriflorus*, and the "original P. *aromaticus*."

The variety β of *Hort. Kew.* is, according to Sir J. Banks's Herbarium, a very ſlight one, with ſhorter and broader leaves. This is, however, the identical *Lept. ſquarroſum* of Gærtner.

What P. *aromaticus* of *Hort. Kew.* is I have not determined, and muſt therefore omit it for the preſent.

2. L. *flaveſcens*, foliis lineari-lanceolatis obtuſis enerviis, calycibus glabris: dentibus membranaceis coloratis nudis.

The flowers appear to be of a fine yellow in the dried ſpecimens. I have not ſeen this ſpecies living.

3. L. *attenuatum*, foliis lanceolato-linearibus acutis trinerviis, calycibus ſericeo-villoſis: dentibus membranaceis coloratis nudiuſculis.

Neither

Neither have I ſeen this living. The flowers ſeem to be white, and generally grow two together on ſhort flower-ſtalks, which are ſilky like the calyx.

4. L. *laniger um*, foliis obovato-lanceolatis trinerviis, calycibus ſericeo-villoſis: dentibus foliaceis perſiſtentibus.
L. trinerve. *White's Voyage*, 229. *tab.*
Philadelphus laniger. *Ait. Hort. Kew. v.* 2. 156.
Myrtus Amboinenſis montana. *Rumph. Amb. v.* 2. *t.* 18.?

This ſpecies varies with ſmooth and downy leaves, and the calyx is ſometimes merely ſilky, ſometimes clothed with long and thick projecting down. Some of its varieties are in the gardens, eſpecially what I take to be the β of *Hort. Kew.* which has ſmall downy twiſted leaves, with a little recurved point, and is commonly called *Philadelphus pubeſcens.* It may be a diſtinct ſpecies.

5. L. *parvifolium*, foliis obovatis enerviis, ramulis calycibuſque piloſis: dentibus membranaceis coloratis.

Of this I have only one ſpecimen, nor have I ſeen it alive; but it is very diſtinct.

6. L. *arachnoideum*, foliis ſubulatis pungentibus, ramulis hirtis, calycibus dentibuſque villoſis.
L. arachnoides. *Gærtn. v.* 1. 175. *t.* 35.

I have but a ſingle ſpecimen of this ſpecies, which agrees well with Gærtner's figure and original ſpecimen at Sir Joſeph Banks's.

7. L. *juniperinum*, foliis lineari-lanceolatis pungentibus, ramulis ſericeis, calycibus glabris: dentibus membranaceis coloratis nudis.

This is in the gardens, if I miſtake not; but I have not ſeen the flowers freſh. Mr. Fairbairn gave it me by the name of *Phil. dioſmifolius.*

8. L. *baccatum*, foliis lineari-lanceolatis pungentibus, ramulis hirtis, calycibus glabris: dentibus membranaceis coloratis pubeſcentibus, capſula baccata.

This is a low depreſſed ſhrub. The flowers ſeem to be yellow, and, by the appearance of the dried fruit, it muſt be very pulpy. I have received from Meſſrs. Lee and Kennedy a ſpecimen which, for want of the fructification, I ſcarcely know whether to refer to this or to L. *arachnoideum*, but it rather appears to be that ſpecies.

9. L. *ambiguum*, foliis linearibus apice recurvis, calycibus glabriuſculis: dentibus foliaceis lanceolatis nudis, ſtaminibus corolla longioribus.

Of all the ſpecies I have examined this is the only one that has the ſtamina longer than the corolla, which is a character of *Metroſideros*; but as it differs from that genus, and agrees with *Leptoſpermum*, in the much more important character of the capitate ſtigma, as well as in habit, I do not heſitate to which to refer it. This ſpecies flowered magnificently in the garden of George Hibbert, Eſq. F.L.S. this ſummer. The flowers are white.

All theſe 9 ſpecies I have received from New South Wales.

Perhaps L. *virgatum* of Forſter, (*Melaleuca virgata* of *Linn. Suppl.*) ought to be added to the liſt of known ſpecies; but the two ſpecimens in the Linnæan Herbarium, which are all I have ſeen, are ſcarcely ſufficient to ſatisfy my doubts. The ſtamina, as far as I can diſcover, are regularly ten. If the fruit therefore be unilocular or bilocular, it may be an *Imbricaria*, with a double number of ſtamina

ſtamina to the other ſpecies. If the capſules ſhould be found to have 3 or 4 cells, I ſhould incline to reckon it a decandrous *Baeckea*, with which genus its oppoſite leaves, as well as the ſize and appearance of the flowers, agree; whereas every *Leptoſpermum* that I know of, has alternate leaves. It muſt be left for future conſideration.

### 4. FABRICIA. *Gærtn. Sem. t.* 35.

ICOSANDRIA *Monogynia*, after *Leptoſpermum*.

CHAR. GEN. *Calyx* 5-fidus, ſemiſuperus. *Petala* 5, ſeſſilia. *Stigma* capitatum. *Capſula* multilocularis. *Semina* alata.

Gærtner enumerates two ſpecies of *Fabricia*, of which I have received only one, his *lævigata*, from New South Wales, which is alſo plentiful in the gardens about London, but has never yet flowered. Neither have my ſpecimens any flowers, though they abound with ſeſſile axillary capſules, ſome of which have the ſtyle upon them. The petals being ſeſſile (without *ungues*) is the only part of the generic character which I have borrowed from Gærtner. The numerous cells of the fruit, from 8 to 10, and eſpecially the winged ſeeds, ſufficiently diſtinguiſh this genus from *Leptoſpermum*, to which it is next akin.

The leaves of F. *lævigata* are alternate, obovate, ſmooth, very obſcurely 3 or 5-nerved, of a light glaucous green. The teeth of the calyx are of a triangular figure, whereas in F. *myrtifolia* they are nearly orbicular. This laſt-mentioned ſpecies is alſo twice as large as the other in all its parts.

5. METROSIDEROS. *Banks. Mſs. Gærtn. Sem. t.* 34. *f.* 2.

Leptoſpermum. *Forſt. Gen.* 36. *t.* 36. *f.* a—e & m—t.

ICOSANDRIA *Monogynia*, after *Fabricia.*

CHAR. GEN. *Calyx* 5-fidus, ſemiſuperus. *Petala* 5. *Stamina* longiſſima, exſerta. *Stigma* ſimplex. *Capſula* 3 vel 4-locularis.

That this is a moſt diſtinct natural genus from *Leptoſpermum*, as above defined, there can be no doubt, though ſome great botaniſts have united them. Sir Joſeph Banks, however, and Dr. Solander, were well aware of their difference, and characterized *Metroſideros* by its very long ſtamina. The ſtigma being ſimple and ſmall, not capitate nor depreſſed, ſcarcely dilated, I beg leave to propoſe as a very certain and conſtant mark of diſtinction. The habit, moreover, is totally different from *Leptoſpermum*, and agrees with that of *Melaleuca*; at leaſt this is the caſe with ſuch ſpecies as have alternate leaves, and thoſe with oppoſite ones have no reſemblance to *Leptoſpermum.*

The petals are concave, nearly ſeſſile, deciduous, generally leſs coloured than the ſtamina. The capſule has moſt generally three valves, and as many cells, rarely four. I believe it might ſafely be defined *trilocularis* abſolutely, but I have mentioned the number four in deference to Gærtner, till I can determine and examine all his ſpecies, which are very obſcure. His *gummifera* is an *Eucalyptus*, and ſome of his others are very doubtful. The ſpecies of this genus, deſcribed as *Melaleucæ* by the younger Linnæus and Dr. G. Forſter, are alſo very much confuſed, theſe authors having mutually miſunderſtood each other ſo often, and formed their definitions ſo looſely, that, with moſt of their original named ſpecimens before

before me, I can hardly clear up every doubt; nor can I, at preſent, determine how many of Forſter's ſpecies are among Gærtner's. The following thirteen are certainly diſtinct, and all in my herbarium.

* *Foliis oppoſitis.*

1. METROSIDEROS *hiſpida*, foliis oppoſitis baſi cordatis amplexicaulibus, ramulis pedunculis calycibuſque hiſpidis.

This is a very magnificent ſpecies, eaſily diſtinguiſhed by its broad ſeſſile oppoſite leaves, and hiſpid branches. The flowers are yellow, with wide-ſpreading ſtamina, and grow in umbels, many of which unite to form a large terminal *corymbus*, rough with red-brown hairs, like thoſe of the *Robinia hiſpida*. Young plants of this *Metroſideros* are to be ſeen in moſt collections about London, but none has yet flowered.

2. M. *floribunda*, foliis oppoſitis petiolatis ovato-lanceolatis, panicula brachiata, pedicellis umbellatis.

The flowers are ſmaller than thoſe of the laſt, and appear to be white. The panicles are formed of ſeveral branches croſſing each other, and terminating in little umbels. Sometimes the flower-ſtalks are hiſpid, ſometimes ſmooth.

3. M. *coſtata*, foliis oppoſitis petiolatis lineari-lanceolatis acuminatis obliquis, panicula brachiato-decompoſita, pedicellis ſubumbellatis.

M. coſtata. *Gærtn. Sem. v.* 1. 171. *t.* 34. *f.* 2.

This may be known from the preceding by its narrower, longer, more rigid and ſhining, oblique or falcated leaves. The panicle is more irregularly and repeatedly branched; its utmoſt ramifications

but imperfectly umbellate. The flowers are much larger, yellowiſh white. Both kinds are ſtrangers to our gardens.

Theſe three ſpecies were found at Port Jackſon, New South Wales, by Mr. White.

4. M. *diffuſa*, foliis oppoſitis ovatis venoſis utrinque glabris, paniculis axillaribus terminalibuſve, pedicellis oppoſitis.
Melaleuca diffuſa. *Forſt. Prod.* 37, ex deſcr.
——— lucida. *Linn. Suppl.* 342.

Gathered in New Zealand by Meſſrs. Forſter. Of this I have ſeen only one ſpecimen, which was given to Linnæus by Dr. Sparrman for the *Leptoſpermum collinum* of Forſter. It is, however, totally different from other ſpecimens in the Linnæan Herbarium from Forſter himſelf, marked *collinum*, and which perfectly anſwer to the deſcription. This can be no other than the *Melaleuca diffuſa* of Forſter's *Prodromus*.

5. M. *villoſa*, foliis oppoſitis ovatis venoſis ſubtus pubeſcentibus, thyrſis axillaribus terminalibuſve oppoſitis villoſis, floribus ſeſſilibus confertis.
Melaleuca villoſa. *Linn. Suppl.* 342.
——— æſtuoſa. *Forſt. Prod.* 38.
Leptoſpermum collinum. *Forſt. Gen. N.* 2.
Metroſideros ſpectabilis. *Gærtn. Sem. v.* 1. 172. *t.* 34. *f.* 9.?

A native of *O-Taheiti*. We have it not in the gardens.

The ſtem is much branched. Young branches and backs of the younger leaves downy; the flower-ſtalks, bracteæ, and calyx, very much ſo. Flowers red, very ornamental, ſtanding at the end of each branch in a pair of ſmall denſe panicles or *thyrſi*, which are truly

truly axillary and oppoſite, though the branch, terminating abruptly, is not protruded beyond them.

6. M. *florida*, foliis oppoſitis obovato-oblongis venoſis glabris, thyrſo terminali, calycibus turbinatis nudis.
Melaleuca florida. *Forſt. Prod.* 37.
Leptoſpermum ſcandens. *Forſt. Gen. N.* 1.

A native of New Zealand, not yet introduced into our gardens. The branches are long, each terminated by a *thyrſus* of large yellowiſh flowers, whoſe calyx is remarkably lengthened out, almoſt as in the clove. The leaves are ſmooth. The flower-ſtalks and calyx ſcarcely perceptibly ſilky, with cloſe-preſſed hairs.

7. M. *glomulifera*, foliis oppoſitis ovatis reticulato-venoſis ſubtus pubeſcentibus, capitulis lateralibus pedunculatis bracteiſque tomentoſis.

Gathered near Port Jackſon by Mr. David Burton. It is a tree, with round oppoſite branches. Leaves oppoſite, on ſhortiſh downy footſtalks, ovate, entire, a little waved, reticulated with numerous veins, clothed with ſhort ſoft down on the under ſide. Flowers greeniſh yellow, cluſtered in little globular heads, which ſtand on ſimple downy foot-ſtalks about an inch long, growing laterally, (moſtly oppoſite to each other) juſt above the inſertion of the uppermoſt leaf-ſtalks and contrary to them. Each head of flowers is accompanied by a pair of oblong downy bracteæ, and the calyx is alſo downy.

This ſpecies is but ſlightly aromatic. It is ſaid to be very rare.

8. M. *anguſtifolia*, foliis oppoſitis lineari-lanceolatis nudis, pedunculis axillaribus umbellatis, bracteis lanceolatis glabris deciduis.

Myrtus anguſtifolia. *Linn. Mant.* 1. 74.

A native of the Cape of Good Hope. The original ſpecimen in the Linnæan Herbarium was ſent by Profeſſor Schreber, and, having no fruit, might eaſily be miſtaken for a *Myrtus*. Linnæus afterwards received another ſpecimen from Profeſſor Thunberg, laden with ripe capſules in the lower part of the branches, and budding flowers above. This he did not perceive to be his *Myrtus anguſtifolia*, but, on examination of the capſules, determined it a *Leptoſpermum* (which it is, as that genus ſtands in its firſt author Forſter), and wrote that name on the back of the paper not long before his death, as appears by the hand-writing. His ſon and ſucceſſor, leſs cautious, placed this ſame ſpecimen in the herbarium, writing upon it *Myrtus anguſtifolia*, without any remark. I find it upon examination a true *Metroſideros*. The ſtamina are diſtinct, thrice as long as the petals, and twice as long as the ſtyle, which has a perfectly ſimple ſtigma. Calyx-teeth deciduous.

The ripe capſules preciſely reſemble thoſe in Gærtner's figure of *Melaleuca ſuaveolens*, but that is, in other reſpects, a very different plant.

Burman's ſynonym (*Flo. Afr.* 237. *t.* 83. *f.* 2.), quoted by Linnæus, can hardly belong to this plant, unleſs his deſcription be very bad; for he calls the fruit a black berry, with one cell and a ſingle ſeed.

The dried leaves of this ſpecies are tinged with the ſame metallic green that is obſervable in thoſe of *Metroſideros hiſpida*, and ſome other New Holland plants of this order.

* *. *Foliis*

** *Foliis alternis.*

9. M. *ciliata*, foliis ſparſis ſub-oppoſitis ellipticis obtuſis coriaceis baſi ſubciliatis, corymbis terminalibus piloſis.
Melaleuca ciliata. *Forſt. Prod.* 38.
Leptoſmermum ciliatum. *Forſt. Gen. N.* 3.

Gathered by Meſſrs. Forſter in New South Wales? *(Novæ Caledonia).* Not yet introduced into the Engliſh gardens.

The leaves are remarkably rigid, thick, and concave, their margin reflexed, like thoſe of *Celaſtrus lucidus*, but leſs ſhining; whitiſh, and reticulated with tranſverſe veins beneath, and marked with a ſtraight central nerve. It is extraordinary that Dr. Forſter characterizes them as without nerve or veins. Thoſe parts may perhaps be leſs viſible in recent ſpecimens. The baſe of moſt of the leaves is ciliated with long ſpreading hairs, like thoſe on the young branches, flower-ſtalks, calyx, and even petals. The flowers are large, handſome, deep-red, but few together, in a terminal corymbus or umbel. Fruit large, depreſſed, projecting in three lobes much above the rim of the calyx.

10. M. *linearis*, foliis ſparſis linearibus canaliculatis acutis rigentibus, floribus lateralibus confertis ſeſſilibus.
Melaleuca linearis. *Schrader Sert. Hannoveran.* 19. *t.* 11.

This is not uncommon in the Engliſh collections; but has not yet flowered here, though it has at Hanover. The leaves are very long, narrow, ſomewhat pungent, rigid, and harſh. There is a variety with ſemicylindrical leaves, more rough on the back than the more common kind. The flowers ſurround the branches in a long

long cylindrical ſeſſile cluſter. Their petals are green, often ſlightly downy; ſtamina very long, crimſon. Capſules round, depreſſed, when old crowding each other into an angular form.

11. M. *lanceolata*, foliis alternis lanceolatis mucronatis, floribus lateralibus confertis ſeſſilibus pubeſcentibus.
M. citrina. *Curt. Mag. t.* 260.

A beautiful ſhrub, now very common in every greenhouſe, which firſt flowered ſeveral years ago at the Marchioneſs of Rockingham's, but not in perfection; neither does Mr. Curtis's figure give a good idea of the natural ſituation of its bloſſoms, which very nearly reſemble thoſe of the preceding.

It is totally unaccountable to me how this plant came by the name of *citrina*, there being nothing about it approaching to a lemon-colour, except the pollen, which would hardly have occaſioned ſuch a denomination. Sometimes I have imagined it might allude to a reſemblance in the appearance or ſmell of the leaves to a lemon tree, which however does not exiſt; and if it did, the name ought to have been *citrea*. I would never change a name that has been generally in uſe, whether publiſhed or not; but this is too preposterous to be retained.

12. M. *ſaligna*, foliis alternis lanceolatis utrinque attenuatis mucronatis, floribus lateralibus confertis ſeſſilibus glabris.

This is diſtinguiſhed from the preceding by its tapering leſs rigid leaves, ſmaller yellowiſh flowers, the calyx and petals of which are quite ſmooth in all their parts, neither downy nor fringed. It is not in the gardens. I had a ſuſpicion this might be the M. *viminalis* of Gærtner; but the original ſpecimens of that ſpecies at Sir Joſeph

Joſeph Banks's are very different, having linear-lanceolate leaves, not tapering at the ends, and downy flowers.

Rumphius's *tab.* 17. *f.* 2. *vol.* 2, has ſome reſemblance to this plant, but he deſcribes his as very aromatic, which ours is not at all.

13. M. *capitata*, foliis ſparſis obovatis mucronulatis, capitulis terminalibus, calycibus ramuliſque piloſis.

This differs widely in appearance from all the other ſpecies.

The leaves are ſcarcely one-third of an inch in length, very ſlightly veined, obſoletely crenate, or rather rough in the margin with minute points. Flowers on ſhort flower-ſtalks, in little terminal heads. Calyx tubular, very hairy, with foliaceous permanent teeth. Petals ſmall, purple. Stamina of the ſame colour, and about thrice as long as the corolla. Germen very ſmall, in the bottom of the calyx. Style equal to the ſtamina; the ſtigma a little enlarged, but not capitate.

I have not ſeen the fruit in any degree of maturity, but there can be no doubt of its being that of a *Metroſideros*, as I have detected the rudiments of three ſmall valves. The form of the flower is much like the *Lythrum* tribe. The leaves are punctate, though ſcarcely aromatic.

This is not, to my knowledge, in the gardens. I am indebted to Mr. White for ſpecimens of it, and the three preceding, from New South Wales.

6. MELALEUCA *Linn.*—*Gærtn. Sem. t.* 35. *Juſſ. Gen.* 323.

POLYADELPHIA *Polyandria.*

CHAR. GEN. *Calyx* 5-fidus, ſemiſuperus. *Petala* 5. *Filamenta*

 multa,

multa, longiſſima, connata in 5 corpora. *Stylus* 1. *Capſula* 3-locularis.

Perhaps this genus is not naturally diſtinct from the laſt, the union of the filaments being all that diſtinguiſhes *Melaleuca*; for in the reſt of the fructification, as well as in habit, they agree. Accordingly the younger Linnæus, the two Forſters, and Schreber unite them into one, and Juſſieu ſeems inclined to do ſo. Unfortunately theſe great authorities fall to the ground, and their opinion can by no means be conſidered as of any weight in this caſe, as we find them confounding with the above the true genus of *Leptoſpermum*, than which nothing can be more diſtinct, in every circumſtance that characterizes a natural or artificial genus. Gærtner, ſo little attentive in general to any thing but the fruit, preſerves all the three ſeparate; though ſeveral of his ſpecies of *Metroſideros*, which he knew only in fruit, prove to be *Melaleucæ*.

The following eleven very diſtinct ſpecies of *Melaleuca* I have examined in flower, and am therefore certain of their genus.

* *Foliis alternis.*

1. MELALEUCA *Leucadendron*, foliis alternis lanceolatis acuminatis falcato-obliquis quinquenerviis, ramulis petioliſque glabris.
M. Leucadendron. *Linn. Mant.* 1. 105. *Suppl.* 342 α.
Arbor alba. *Rumph. Amb. v.* 2. 72. *t.* 16.

This tree is a native of ſome parts of the Eaſt Indies, and from it is diſtilled the green aromatic oil called *Cajeput*, from *Caju Puti*, a white tree, the Malay name of the plant; hence Linnæus gave the name of *Leucadrendon* to this ſpecies.

2. M. *viri-*

2. M. *viridiflora*, foliis alternis elliptico-lanceolatis coriaceis quinquenerviis, ramulis petioliſque pubeſcentibus.
M. viridiflora. *Gærtn. Sem. v.* 1. 173. *t.* 35.
M. Leucadendron *β*. *Linn. Suppl.* 342.

Unqueſtionably a very diſtinct ſpecies from the preceding, with which the younger Linnæus confounded it. The leaves are much more thick and rigid, ſtraight, not falcated, nor ſo much pointed, of a lighter colour, with generally five, but ſometimes ſeven nerves. The footſtalks and younger branches are downy, which is not the caſe in M. *Leucadendron*.

This grows in New South Wales. The flowers are pale yellowiſh green.

3. M. *laurina*, foliis alternis obovato-lanceolatis uninerviis, pedunculis axillaribus dichotomis pubeſcentibus.

Specimens of this were brought to Sir Joſeph Banks from New South Wales by Governor Philip. It is nearly allied to *Melaleuca ſuaveolens* of Gærtner, *tab.* 35, with which its infloreſcence and fructification almoſt entirely agree, but the leaves of that are much broader and elliptical. Thoſe of M. *laurina* have a great reſemblance to the *Daphne laureola*. Neither is this ſpecies at all aromatic, which the other ſhould ſeem by its name to be. M. *ſuaveolens* comes from the hotter parts of New Holland, near Endeavour river.

4. M. *ſtypheloides*, foliis alternis ovatis mucronato-pungentibus multinerviis, floribus lateralibus, dentibus calycinis ſtriatis mucronatis.

Gathered near Port Jackſon by Mr. David Burton. It has alto-

gether the habit of a *ſtyphelia*. The leaves are thick-ſet, twiſted, harſh, pungent and ſtriated, exactly as in ſeveral of that genus, and very ſlightly aromatic, ſo that it could hardly be taken for one of the *Myrti*, except by the fructification.—The flowers are white, ſurrounding the lower part of the youngeſt branches in very ſhort cluſters. Calyx downy, with erect, rigid, ſpinous, ſtriated, permanent teeth. Petals ſmooth, membranous. Stamina twice as long as the calyx.

5. M. *ericifolia*, foliis ſparſis oppoſitiſve linearibus enerviis ſubrecurvis muticis, floribus lateralibus apicem verſus ramulorum confertis.

The dried leaves of this ſpecies taſte ſtrongly of coriander ſeeds. I have not ſeen it growing. Its flowers are white, growing in ſhort cluſters round the branches, as in the following, but not quite ſo near the top. Its leaves differ widely from that ſpecies, being much ſmaller, not pungent nor rigid, but a little recurved. The young bark is of a ſilvery white. I have not ſeen the fruit.

6. M. *nodoſa*, foliis ſparſis linearibus mucronato-pungentibus rectis, floribus apicem verſus ramulorum glomeratis. Metroſideros nodoſa. *Gærtn. Sem. v.* 1. 172. *t.* 34. *f.* 6.

The leaves are numerous, ſcarcely an inch long, very narrow, though broader than thoſe of M. *ericifolia*, ſtiff, and ſharp pointed. Flowers ſmall, whitiſh, cluſtered round the tops of the youngeſt branches, ſo as to appear like little *capitula*; but after flowering the branch is protruded beyond them, and the ripening capſules remain inveſting it in an annular manner. The figure of Gærtner repreſents them in their moſt advanced ſtate, apparently bleached by expoſure

expoſure to the air. I have conſulted his ſpecimens, and find no reaſon to doubt their being the ſame as mine.

7. M. *armillaris*, foliis ſparſis linearibus mucronatis apice recurvis, floribus lateralibus, filamentis longiſſimis linearibus apice radiato-multifidis.

Metroſideros armillaris. *Gærtn. Sem. v.* 1. 171. *t.* 34. *f.* 5.

This has much the habit of a *Dioſma*, in the leaves eſpecially, which, in a garden ſpecimen with which I was favoured from Mr. Robertſon's at Stockwell, are very diſtinctly marked with a row of reſinous ſpots on each ſide the mid-rib at the back, but theſe are leſs viſible in the wild plant. The flowers are white, cluſtered about the lower part of the branches, in the form of a long ſpike. The footſtalk or claw of the united filaments is very long before it branches off, even thrice the length of the petals.

8. M. *geniſtifolia*, foliis ſparſis lanceolatis mucronatis trinerviis multipunctatis, ramulis floriferis terminalibus laxis, filamentis apice radiato-multifidis.

Sent from Port Jackſon by Mr. David Burton. It is in ſome reſpects like M. *nodoſa*, but the leaves are lanceolate rather than linear, not above half ſo long as in that ſpecies, nor ſo rigid and pungent. The branches terminate in looſe ſpikes, from the top of which the branch is at length continued, as in the other ſpecies. The flowers are ſeſſile, in alternate pairs, white. Claw of the ſtamina twice as long as the petals before the filaments branch off.

* * *Foliis oppoſitis.*

9. M. *linariifolia*, foliis oppoſitis lineari-lanceolatis trinerviis ſubtus multipunctatis, ramulis floriferis terminalibus laxis, filamentis pinnatis.

This, we are told by Mr. White, is a large tree, the bark of which is very thick and ſpongy, ſerving the purpoſe of tinder. The branches are clothed with tapering glaucous leaves, thrice as long as in the laſt ſpecies, and from the ſummits ſpring ſeveral young branches, ſet with a ſeries of oppoſite ſeſſile ſolitary white flowers, (not, as in that, in pairs ranged alternately), beyond which the branch is ſoon protruded. The moſt eſſential character however of this ſpecies conſiſts in the filaments, which are very long, being pinnated, or ranged with ſtamina on each ſide, more or leſs regularly, from near the baſe to the ſummit. The leaves have a nutmeg-like flavour.

10. M. *thymifolia*, foliis oppoſitis elliptico-lanceolatis enerviis, ramulis floriferis lateralibus breviſſimis paucifloris, filamentis medium uſque ramoſis.

Mr. Fairbairn has preſented flowering ſpecimens of this ſpecies to the Linnæan Society from Chelſea garden. The flowers are purple, ranged along the branches of a year or two old, in little ſhort oppoſite ſpikes; which however ſoon prove to be real branches by the leaves ſhooting out at their ends, this lateral mode of inflorescence being common to almoſt the whole genus, M. *laurina* and *ſuaveolens* only having axillary branching flower-ſtalks, nor have I yet ſeen a *Melaleuca* with terminal flowers.

The

The teeth of the calyx in M. *thymifolia* are permanent, and the whole of that part, as well as the back of the leaves, abounds with a fragrant eſſential oil, lodged in pellucid prominent dots.

11. M. *hypericifolia*, foliis oppoſitis elliptico-oblongis uninerviis, floribus confertis, filamentis longiſſimis linearibus apice radiato-multifidis.

The moſt beautiful of the genus. It grows in ſwampy ground, and is found like all I have now deſcribed, except the firſt ſpecies, in New South Wales. M. *hypericifolia* is plentiful in the Engliſh gardens, and was generally taken for an *Hypericum*, till it lately produced, in ſeveral collections near London, its elegant flowers. Theſe grow in a cylindrical form round the branches, and have ſome reſemblance to thoſe of my *Metroſideros lanceolata* (commonly called *citrina)*, occaſioned by the radiated crimſon filaments projecting in every direction. The claws of thoſe filaments are very long, linear, and of a dull yellowiſh hue like the petals.

7. MYRTUS *Linn.—Gærtn. Sem. t.* 38. *Juſſ. Gen.* 324.

ICOSANDRIA *Monogynia.*

CHAR. GEN. *Calyx* 5-fidus, ſuperus. *Petala* 5. *Bacca* bi-vel tri-locularis. *Semina* plurima, gibba.

Few genera are more confuſed in the works of Linnæus than *Myrtus*. The above characters will ſerve to define all that properly belong to this genus, of which I have received from New South Wales the following two ſpecies only.

1. MYRTUS *tenuifolia*, pedunculis axillaribus ſolitariis unifloris, foliis linearibus mucronulatis.

An elegant little ſhrub which has not yet appeared in the gardens. The leaves are oppoſite, ſomewhat more than an inch in length, and about a line in breadth, ſlightly revolute, downy beneath. Flower-ſtalks ſilky, ſhorter than the leaves, each bearing a ſmall white flower, often tinged externally with red, and not unlike the common myrtle bloſſom, though ſcarcely half ſo large. The germen is very ſilky. Calyx nearly ſmooth. Petals downy. The ripe fruit I have not ſeen, but from an examination of the germen, and every part of the flower, I think there can be no doubt of the genus.

2. M. *trinervia*, pedunculis axillaribus trifloris, foliis ovatis acuminatis trinerviis ſubtus tomentoſis.

This is alſo a ſtranger to our gardens. The leaves are large and handſome, oppoſite, ovate pointed, downy beneath, with three ſtrong nerves, as in thoſe of *Blakea*. Flowers ſmall, generally three together, on ſhort, hairy, forked, axillary flower-ſtalks. Although the teeth of the calyx, and the petals alſo, are generally but four, it is a true *Myrtus*, and not an *Eugenia*, the fruit being a berry with many ſhining gibbous curved ſeeds. It has but one cell when ripe, but the germen appears to be divided into two or three cells.

## 8. EUGENIA *Linn.—Juſſ. Gen.* 324.

Syzygium, *Gærtn. vol.* 1. 166. *t.* 33. *f.* 1.

CHAR. GEN. *Calyx* 4-fidus, ſuperus. *Petala* 4. *Bacca* unilocularis, monoſperma.

1. EUGENIA

1. EUGENIA *elliptica*, foliis ellipticis acuminatis, floribus paniculatis, calyce repando, bacca globosa.

A tree or shrub of New South Wales, with round dichotomous leafy branches. The leaves are opposite, on short foot-stalks, elliptical, pointed at both ends, entire, a little revolute, smooth, with one rib and many parallel side veins. Panicles about the summits of the branches, axillary and terminal, erect, consisting of numerous, opposite, smooth, branched and forked stalks, without *bracteæ*. Flowers small. Calyx clavate, its margin waved, but not toothed. Petals four, white, very minute and fugacious. Stamina numerous. Style short, with a simple stigma. Berry the size of a large pea, globular, white, crowned with the calyx, and consisting of a thick pulpy coat, investing a solitary seed. The leaves are full of resinous spots, and the calyx abounds with a fragrant essential oil.

No plant in the order has given me so much trouble, to determine its genus, as this. It undoubtedly belongs to the *Syzygium* of Gærtner, *tab.* 33, which is to be distinguished from *Eugenia* only by having a *bacca* with a single seed, instead of a *drupa*. Gærtner indeed has not told us exactly what he understood by *Eugenia*, nor has he figured any thing under that name; but I presume he meant either the original *Eugenia uniflora* of Micheli, or the *E. Iambos*. I have examined ripe fruits of both these, and the young germen of the former of them, which has two cells, with the rudiments of a seed in each. When the fruit is ripe, it in both species consists of one large seed, clothed with a very thin shell or skin, without any fissure or seam, and the whole enveloped in a firm fleshy pulp. In my *Eugenia elliptica* just described, the pulp is immediately attached to the seed itself, as Gærtner describes his *Syzygium*. I think however with Jussieu, that the two genera may be safely united; for we

find another circumſtance, mentioned by Gærtner as diſcriminating them, the two cells in the germen of *Syzygium*, does not hold good, being alſo to be found in *Eugenia*. I beg leave here to conſider as the true *Eugenia* that which Micheli firſt called ſo, and which ſtands in the latter editions of Linnæus in three different places, being his *Eugenia uniflora*, *Myrtus braſiliana*, and *Plinia pedunculata*, and there is no doubt of its according exactly in generic characters with *Eugenia Iambos*. What really conſtitutes the genus of *Plinia* is very doubtful, Plumier's figures, and the deſcriptions of other authors taken from them, being a maſs of inextricable confuſion; but if theſe figures mean any thing, they cannot accord with our *Eugenia*, nor indeed do they reſemble it, except in the pulpy fruit being furrowed, ſomewhat (but not exactly) like that of *Eugenia uniflora*. I am aware however that the opinion of Linnæus in the *Supplementum Plantarum* is here againſt me, as well as that of my accurate friend Mr. Dryander in the *Hortus Kewenſis*. If Plumier's original ſpecies of *Plinia* ſhould ever be found, it will remove the doubt. In the mean time, one of the few points of which we are certain is, that if the common *Eugenia uniflora* be not a *Plinia*, it muſt conſtitute the real genus of *Eugenia*, whatever the other plants may be that are now arranged under that name; and if it be a *Plinia*, *Eugenia Iambos* is one likewiſe.

9. EUCALYPTUS. *L'Heritier Sert. Angl. t.* 20. *Ait. Hort. Kew. v.* 2. 157. *Bot. of New Holl. t.* 13.

CHAR. GEN. *Calyx* ſuperus, perſiſtens, truncatus, ante antheſin tectus *operculo* integerrimo, deciduo. *Corolla* nulla. *Capſula* quadrilocularis, apice dehiſcens, polyſperma.

There

There is not a more natural genus in the whole Linnæan ſyſtem than this. It is clearly characterized at firſt ſight by the ſingular *operculum* which cloſes the calyx, and covers up the ſtamina and ſtyle till they arrive at maturity. In this reſpect it agrees with the *Calyptranthes* of Dr. Swartz, but differs from that genus in having a capſule, not a berry.

All the ſpecies of *Eucalyptus* hitherto diſcovered come from New Holland. Gærtner being unacquainted with the peculiar ſtructure of their flower, confounded ſome of them with *Metroſideros*. They agree ſo much with one another in habit and leaves, as to be impoſſible to diſcriminate, except by their inflorescence, and the form of their *opercula*. I have already characterized ſome of them in the *Botany of New Holland*, p. 39 to 44; but having ſince become acquainted with many more, it is neceſſary to reviſe the whole, and contraſt their ſpecific characters.

The leaves of all are entire, lanceolate, rarely ovate, more or leſs oblique or unequal at the baſe; flowers either in umbels or *capitula*; the former of which are either ſolitary or panicled, lateral or terminal; the latter always ſolitary and lateral. The genus is conveniently divided into two ſections, in one of which the cover of the flower is conical, in the other hemiſpherical.

* *Operculo conico.*

1. Eucalyptus *robuſta*, operculo conico medio conſtricto calyce latiori, umbellis lateralibus terminalibuſque, foliis ovatis.

E. robuſta. *Bot. of New Holland*, 40. *t.* 13.

This is called the brown gum tree, or New Holland Mahogany, its wood being red, hard and heavy, in ſome degree anſwering the

purpoſes of the Weſt Indian mahogany. Its leaves are broader than in any other ſpecies that has come to my knowledge, and the flowers larger, except only thoſe of E. *corymboſa*.

2. E. *pilularis*, operculo conico medio conſtricto longitudine calycis, umbellis lateralibus, fructu globoſo, foliis linearilanceolatis.

The leaves are much narrower than in the preceding, and the flowers not half ſo large; neither is their cover, as in that, more in diameter than the calyx. The fruit is globoſe. I ſuſpect that of E. *robuſta* to be turbinate with a reflexed margin, but I have ſeen it only half ripe.

3. E. *tereticornis*, operculo conico tereti læviſſimo membranaceo calyce latiori triploque longiore, umbellis lateralibus ſolitariis.
E. tereticornis. *Bot. of New Holland*, 41.

Remarkable for its long, very ſmooth, membranous *operculum*, which burſts juſt above the baſe, leaving the lower part like a ring ſticking for ſome time to the calyx. The leaves are lanceolate and oblique.

4. E. *reſinifera*, operculo conico tereti coriaceo calyce duplo longiori, umbellis lateralibus ſolitariis.
E. reſinifera. *White's Voyage*, 231. *tab.*
Metroſideros gummifera. *Gærtn. Sem. v.* 1. 170. *t.* 34. *f.* 1.

At firſt ſight this nearly reſembles the laſt; but on accurate examination the *operculum* is found only twice the length of the calyx, and

and barely of the ſame diameter with it, not broader. It is moreover not ſo ſmooth, nor of the membranous texture of the *tereticornis*, but thick and leathery as in the other ſpecies, ſeparating entirely from the baſe.

Fig. g in Mr. White's plate we now know to be a diſeaſed flower, not an impregnated one.

5. E. *capitellata*, operculo conico obtuſiuſculo calyceque anguloſo ſubancipiti, capitulis lateralibus ſolitariis, fructu globoſo, foliis ovato-lanceolatis.

E. capitellata. *Bot. of New Holland*, 42.

Fruit, *White's Voy.* 226. *tab. fig.* a.

This eſſentially differs from all the preceding, in bearing its flowers in *capitula*, or little heads, (that is, without partial flower-ſtalks) inſtead of umbels. The cover is not more than equal to the calyx in length, angular like that part, and compreſſed at the ſummit. The leaves ovato-lanceolate, rigid, oblique.

6. E. *ſaligna*, operculo conico acuto calyceque anguloſo ſubancipiti, capitulis lateralibus ſolitariis, fructu turbinato, foliis lineari-lanceolatis.

The leaves are narrower and leſs coriaceous than in moſt of the ſpecies. The little heads of flowers grow on ſhortiſh flower-ſtalks, one from the boſom of each leaf. The flowers are ſmaller than in any of the others. Their covers acute, the length of the calyx. Fruit turbinate with a ſlightly recurved margin, and crowned with the pyramidal permanent baſe of the ſtyle.

** *Operculo*

* * *Operculo hemiſphærico.*

7. E. *botryoides*, operculo hemiſphærico ſubmutico, capitulis lateralibus ſolitariis, pedunculis cuneatis compreſſis, fructu turbinato.

This, like the two preceding, bears its flowers in ſolitary *capitula*, but is diſtinguiſhed from them by its broad hemiſpherical *opercula*, with ſcarcely any point at their ſummit, which, from the cluſtering together of the flowers, look like bunches of ſome kind of berries. The common flower-ſtalks are flat, and very broad, eſpecially at the top. The leaves lanceolate, oblique.

8. E. *hæmaſtoma*, operculo hemiſphærico depreſſo mucronulato, umbellis lateralibus terminalibuſque; pedunculis compreſſis, ramulis angulatis, fructu ſubgloboſo.

The leaves are coriaceous, lanceolate, terminating in a long linear point. Flowers in umbels, not *capitula*, their covers depreſſed at the top, but ſuddenly terminating in a little point. Fruit globoſe, cut off at the ſummit, its orifice ſurrounded by a broad deep-red border. This ſpecies has a great affinity with the *Leptoſpermum umbellatum* of Gærtner, but I dare not aſſert it to be the ſame.

9. E. *piperita*, operculo hemiſphærico mucronulato, umbellis lateralibus ſubpaniculatis ſolitariiſve; pedunculis compreſſis, ramulis angulatis.

E. piperita. *White's Voyage*, 226. *tab.* leaves only. *Bot. of New Holland*, 42.

Very diſtinct and different in appearance from the laſt, though their

their ſpecific characters are very ſimilar. The leaves of E. *piperita* are nearly ovate, though oblique. Flowers ſmaller than thoſe of the preceding, and ſituated all in great numbers about the lower part of the branches, not near the top, a few of the umbels only being ſolitary, the reſt uniting to form ſeveral panicles or *corymbi*.

10. E. *obliqua*, operculo hemiſphærico mucronulato, umbellis lateralibus ſolitariis; pedunculis ramuliſque teretibus.
E. obliqua. *Ait. Hort. Kew. v.* 2. 157. *L'Herit. Sert. t.* 20. *Bot. of New Holland*, 43.

A native of the warmer parts of New Holland. It is the only ſpecies here deſcribed which we have not received from Port Jackſon. The round branches and flower-ſtalks diſtinguiſh it from the laſt, to which it is moſt nearly allied.

11. E. *corymboſa*, operculo hemiſphærico mucronulato, calyce tereti, umbellis corymboſo-paniculatis terminalibus.
E. corymboſa. *Bot. of New Holland*, 43.

The flowers are large and handſome, forming magnificent terminal panicled cluſters of umbels, by which this ſpecies is readily diſtinguiſhed. Leaves lanceolate, coriaceous. Fruit turbinate, the permanent calyx forming a very high urceolate border, the ſtyle remaining in the centre of the cavity.

A fine plant of this kind is in the collection of Meſſrs. Lee and Kennedy, but has not yet flowered.

12. E. *paniculata*, operculo hemiſphærico ſubmutico, calyce anguloſo, umbellis ſubpaniculatis terminalibus.

This differs from the laſt in its angular calyx and leſs pointed

*operculum*, as well as in being ſmaller in all its parts. The umbels do not form ſo conſiderable a compound cluſter or *corymbus*, but are collected about the tops of the branches into a ſmall panicle, the lowermoſt of them being axillary.

My ſpecimens were gathered at Port Jackſon by Mr. David Burton, and I received them from Sir Joſeph Banks's herbarium.

Of all theſe twelve ſpecies of *Eucalyptus*, I am not certain of any more being in the gardens than the *corymboſa*, *obliqua*, and *piperita*. The latter is very common, and may be known by its ſmell, reſembling that of peppermint.—There are however ſeveral New Holland ſhrubs in the collections about London, which I ſuſpect to belong to the ſame genus; but having never ſeen their fructification, I cannot aſcertain them.

XXVI. *Ob-*.

## XXVI. *Obſervations on the Genus* OESTRUS. *By Mr. Bracy Clark, Veterinary Surgeon, and F.L.S.*

*Read November* 1, 1796.

THE following account of the *Oeſtri* was collected from obſervations, which were made during a few months reſidence in a country particularly favourable for remarks of this nature; and though a ſmall part of their hiſtory ſtill remains unknown, theſe obſervations may perhaps be acceptable to the Linnean Society, from the additional information they contain concerning this genus, and from the correction of ſome material errors which are, at preſent, generally admitted as truths by naturaliſts.

The pain the *Oeſtri* inflict on the animals that are ſubject to them particularly entitles them to our notice, and more eſpecially as thoſe are unfortunately the uſeful and the domeſticated. By their continual attacks, theſe ſmall, yet formidable, enemies interrupt the few moments of repoſe and enjoyment allowed to theſe uſeful ſlaves during the ſummer months. Nor does the puniſhment end here: the *larvæ*, by remaining with them, are frequently ſuppoſed the cauſe of their diſeaſe, and even death. Theſe circumſtances render the inveſtigation of their natural hiſtory an object of ſome importance; and the extraordinary means they purſue in depoſiting their eggs, the ſituations the *larvæ* inhabit, and the very high temperature to which they are expoſed, render their hiſtory intereſting from its ſingularity.

If the preſent inveſtigation ſhould prove acceptable to the ſcientific naturaliſt, from the ſpecies being exhibited with greater perſpicuity than they have hitherto been; it is alſo hoped the deſcription of their economy and manners will render it not leſs ſo to the enlightened veterinarian, as tending to point out the moſt effectual means of removing them when they become the ſource of diſeaſe.

The obſcure ſituation of the *Oeſtri* in their *larva* ſtate has been a principal cauſe of their hiſtory being leſs underſtood than that of other inſects; and in ſome inſtances the defective parts have been ſupplied from imperfect obſervation, or mere conjecture; as the Œ. *hæmorrhoidalis* is ſaid to depoſit its eggs "*mirè per anum intrans*," which, though perfectly fabulous, has by frequent repetition on ſuch high authority*, obtained the appearance of an eſtabliſhed truth; and from the ſilence of authors on the ſubject, it appears that the mode in which the other ſpecies depoſit their *ova* has not been at all underſtood.

Since the time of Linnæus the errors of this genus, far from being expunged, have conſiderably accumulated by the confuſion of the ſpecies with one another; which in part may be attributed to inattention, but chiefly perhaps to the difficulty of procuring ſpecimens for examination. The inacceſſible ſituations of the *larvæ*, and the impoſſibility of ſucceſsfully imitating by artificial means their mode of life when removed, have rendered them ſcarce; and in their fly ſtate they are not often ſeen, or eaſily taken. This difficulty will be in a conſiderable degree removed, when their hiſtory and the moſt proper time of obtaining them is pointed out.

The errors will be beſt corrected by means of a plate, repreſenting

* *Linnæi Syſtema Naturæ*, p. 969. This error appears to have originated with Reaumur, who received it from a Dr. Gaſpari. See note on Œ. *hæmorrhoidalis*.

all

all the ſpecies in one view in their various ſtates, taken from the ſubjects themſelves; and this will be the more uſeful and neceſſary, as hardly any of the *larvæ*, or perfect inſects, have ever yet been intelligibly figured.

The obſcure and ſingular habitations of the Britiſh *Oeſtri* are the ſtomach and inteſtines of the horſe, the frontal and maxillary ſinuſes of the ſheep, and beneath the ſkin of the backs of horned cattle. In other parts of the world they inhabit various other animals; but our preſent enquiry is neceſſarily limited to thoſe of our own country, which includes all thoſe about which any difficulty or obſcurity has ariſen.

## *Of the* OESTRUS *Bovis.*

THIS rare ſpecies has been entirely omitted by Linnæus, and appears to have been unknown to nearly all the later writers on Natural Hiſtory, who, inſtead of the true Œ. *Bovis*, have deſcribed a ſpecies peculiar to the horſe under that name. Linnæus imagined alſo that it was the ſame ſpecies which inhabited both the ſtomachs of horſes and the backs of oxen*, which certainly never happens.

The *larva*, tab. 23, fig. 1, taken from the back of the cow, is ſo unlike the other *larvæ* of this genus, that I did not imagine, till I procured the fly from it, that it was the *larva* of an *Oeſtrus*. It does not poſſeſs the *aculei*, the marginal *ſetæ*, or the lips, which are the prominent characters of the *larvæ* of the Œ. *Equi* and *hæmorrhoidalis*.

It lives beneath the ſkin, being ſituated between it and the cellular membrane, in a proper ſack or abſceſs, which is rather larger than the inſect, and by narrowing upwards opens externally to the air by a ſmall aperture.

* Habitat in ventriculo equorum, in boum dorſo. *Linn. Syſt. Nat.* 2. *p.* 969. *ed. duodecima.*

When young the *larva* is ſmooth, white, and tranſparent: as it enlarges it becomes browner, and about the time it is full grown it is totally of a deep-brown colour, having numerous dots on its ſurface, diſpoſed in tranſverſe interrupted lines, paſſing round the ſegments. Two diſtinct and different kinds of lines are ſeen on each ſegment: the uppermoſt of them is narrower, and conſiſts of larger dots. Underneath this is a broader line, and the dots conſiderably ſmaller. The firſt are eaſily ſeen, by uſing the lens, to be hooks bent upwards, or towards the tail of the inſect. See fig. 1, a.

On examining the broader line of ſmall dots (fig. 1, b) with a tolerably powerful magnifier, they are alſo found to be hooks, but turned in an oppoſite direction, that is, downwards in the abſceſs, and towards the head of the inſect.

Theſe hooks, it is probable, are occaſionally erected by the muſcles of the ſkin, and according to the ſeries of them uſed by the *larva*, it is raiſed or depreſſed in the abſceſs; and by this motion, and the conſequent irritation, a more or leſs copious ſecretion of pus is occaſioned for the ſuſtenance of the *larva*.

This ſingular arrangement of hooks round the body of the *larva*, in this inſtance ſerves the ſame purpoſe as the legs in other *larvæ*, enabling it to move about in the abſceſs, and to crawl out of it when ripe, and renders the uſe of the *tentacula* obſervable in the other ſpecies not neceſſary in this.

Beſide theſe on the ſurface of the ſkin, there are a number of rounded unarmed prominent points, which have a minute depreſſion in the centre, and appear to be the *ſpiraculæ*, being the external opening of the extreme branches of the air tubes.

In what manner the pus is received by the *larva* for nouriſhment is not immediately diſcoverable. In the upper part of the *larva*, or that end which is applied to the external opening in the ſkin, may be

be obſerved two ſmall horny plates, which are found on diſſection to cloſe the extremities of the trunks of ſome large air veſſels. Near to theſe plates, and ſomewhat above them, a minute puncture is diſcernible by the aſſiſtance of a microſcope, which was firſt detected by placing the *larva* recently removed from the beaſt in warm water, when a conſiderable column of yellow pus was obſerved to riſe from this aperture, which rendered it ſufficiently viſible. At other times, when cloſed, it was diſcernible with the utmoſt difficulty. At fig. 20, is repreſented this aperture (a), together with the two horny plates, which cloſe up the air veſſels, being a view, very conſiderably magnified, of the upper extremity of the *larva* fig. 1.

From a firſt view, this part would appear to be the head of the *larva;* but as it is found to produce the extremity of the abdomen in the future inſect, it muſt be conſidered as the tail; and the abovementioned minute aperture is undoubtedly the *anus*, and is found to be in conformity to the ſame ſituation of the *anus* in others of this genus.

At the lower end of the *larva*, fig. 1, a ſmall indentation may, with attention, be obſerved, which is the mouth of the *larva.* It is a ſimple aperture, and altogether unprovided with any of the apparatus belonging to the mouths of *larvæ* in general; and near the mouth are ſeen two black points of horn, which appear to be perforated in the centre, and are found by diſſection to be the termination of two conſiderable branches of the air tubes, and correſpond to the two nipples on the laſt ſegment of the *larva* of the Œ. *Equi*, ſeen at fig. 22, a. An enlarged view of the mouth and inferior part of the *larva* of the Œ. *Bovis* is ſeen in fig. 21. Round the oriſice of the mouth are placed ſome projecting *mamillæ*, which are imperforate, and perhaps ſerve the purpoſe of feelers.

The inteſtinal canal in this *larva* is a ſimple membranous tube,

which extends from one extremity to the other, and ſerves the double purpoſe of ſtomach and inteſtine. The inteſtinal canal of the *larva* of the Œ. *Equi* is ſeen repreſented at fig. 26.

The apparatus of air tubes in this *larva* is very ſingular, and is repreſented ſomewhat magnified at fig. 25. In this ſpecies there are only two principal trunks of theſe air veſſels, which are connected near their origin by a lateral trunk. From theſe, branches are ſeen paſſing off in every direction through the ſubſtance of the inſect, ſome of them to the inteſtine, others to the ſkin, and a greater number appear to terminate by anaſtomoſing with each other. As theſe air veſſels form a much greater part of the ſtructure of the *larva* of the Œ. *Equi*, it will be more proper to ſuſpend our obſervations on them till we come to the deſcription of that ſpecies.

The *larva* having arrived at its full growth, effects its eſcape from the abſceſs, by preſſing againſt the external opening, which occaſions its enlargement by the points preſſed upon being gradually abſorbed. When the opening has thus obtained the ſize of a ſmall pea, the *larva* writhes itſelf through, and falls from the back of the animal to the ground, and, ſeeking a convenient retreat, becomes a *chryſalis*.

With conſiderable difficulty I obtained three *chryſalides* of this inſect; one of which is repreſented at fig. 3.

Theſe *larvæ* never change or throw off their ſkin, the ſame ſerving them through their whole growth; and it at length alſo ſerves to form the ſhell of the *chryſalis*. After leaving the abſceſs, and previous to their becoming a *chryſalis*, they contract themſelves into much leſs ſpace, and aſſume a different figure. See fig. 2. The ſack which encloſes the *larva* beneath the ſkin, is formed of a tough, thick membrane, and rough on the inſide; and the pus ſecreted by it, is moſtly of a yellow colour. After the exit of the caterpillar,

pillar, the wound in the ſkin is moſtly cloſed up, and healed within a few days.

The *chryſalides* continued in that ſtate from about the latter end of June until about the middle of Auguſt, when the fly appeared. I have, notwithſtanding, obſerved full-grown *larvæ* in the backs of the cows as late as September, which muſt have produced their flies as late as November or December, or, perhaps, in the enſuing ſpring.

This *larva*, in making its exit, is expoſed to imminent danger, if on land, of being trod on by the cattle, or picked up by birds. If in the water, where the cattle ſtand during great part of the day at this ſeaſon of the year, it periſhes, or becomes the food of fiſhes.

The perfect inſect, on leaving the *chryſalis*, forces open a very remarkable, marginated, triangular lid, or *operculum* (ſee fig. 4), which may be traced in the ſkin of the *larva*, and is ſituated on one ſide of the ſmall end.

The *Oeſtrus Bovis*, in its perfect ſtate (fig. 5 and 6), is the largeſt of the European ſpecies of this genus, and is very beautiful. For its deſcription ſee the concluſion of this paper.

Although its effects on the cattle have been ſo often remarked, yet the fly itſelf is rarely ſeen or taken, as the attempt would be attended with conſiderable danger. The pain it inflicts in depoſiting its egg is much more ſevere than in any of the other ſpecies. When one of the cattle is attacked by this fly, it is eaſily known by the extreme terror and agitation of the whole herd: the unfortunate object of the attack runs bellowing from among them to ſome diſtant part of the heath, or the neareſt water, while the tail, from the ſeverity of the pain, is held with a tremulous motion ſtraight from the body, in the direction of the ſpine, and the head and neck are alſo ſtretched out to the utmoſt. The reſt, from fear, generally

generally follow to the water, or diſperſe to different parts of the field.

And ſuch is the dread and apprehenſion in the cattle of this fly, that I have ſeen one of them meet the herd when almoſt driven home, and turn them back, regardleſs of the ſtones, ſticks, and noiſe of their drivers; nor could they be ſtopped till they reached their accuſtomed retreat in the water.

When the oxen are yoked to the plough, the attack of this fly is attended with real danger, as they become perfectly uncontroulable, and will often run with the plough directly forwards, through the hedges, or whatever obſtructs their way. There is provided, on this account, to many ploughs, a contrivance immediately to ſet them at liberty on ſuch an occaſion.

The ſingular ſcene attending the attack of this fly on the herd, has often been the ſubject of poetical deſcription; but no one has more naturally or elegantly delineated it than the bard of Mantua:

> Eſt lucos Silari circa, ilicibuſque virentem
> Plurimus Alburnum volitans, cui nomen Aſilo
> Romanum eſt, Oeſtron Graii vertere vocantes:
> Aſper, acerba ſonans: quo tota exterrita ſylvis
> Diffugiunt armenta; furit mugitibus æther
> Concuſſus, ſylvæque et ſicci ripa Tanagri.
>
> GEORG. lib. iii. ver. 146—151.

The heifers, ſteers, and younger cattle, are the moſt frequently attacked by this fly, and have in general a greater number of botts than others:—the ſtrongeſt and healthieſt beaſts ſeem conſtantly to be preferred by it, and this is a criterion of goodneſs in much eſteem with the dealers in cattle*.

* The choice of a ſound healthy ſubject for the depoſition of the eggs, is probably cauſed by the ſolicitude of the parent for the ſafety of its offſpring.

And

And the tanners alſo obſerve, that their beſt and ſtrongeſt hides have the greateſt number of bot-holes in them: for although the ſkin heals up on the exit of the *larva*, it is not with the ſame matter as the original ſkin; which has been remarked by late phyſiologiſts, and which this curious fact ſufficiently confirms. In the leather, when dry, thoſe holes which were made in the ſkin the year preceding the death of the beaſt, cannot be diſtinguiſhed from the others which were made at any former period, not being in any perceptible degree leſs filled up. In the dried hide it does not appear a round hole as in the living ſkin, but as a crack only. This ariſes from the ſpongy ſubſtance which had filled the aperture, contracting in drying, and burſting, and alſo from the artificial mode of hammering and preparing the hide.

The female fly is very quick in performing the operation of depoſiting its egg: ſhe does not appear to remain on the back of the animal more than a few ſeconds; and I have not obſerved that the cow ever attempts to laſh this inſect off with her tail, which ſhe performs ſo dexterouſly when attacked by other flies *.

The whole of this genus of inſects appear to have a ſtrong diſlike to moiſture, ſince the animals find a ſecure refuge when they get into a pond or brook, where the *Tabani*, *Conopes*, and other flies, follow without heſitation, but the *Oeſtri* rarely or never; and during cold, rainy, or windy weather they are not to be ſeen.

The *larvæ* of this inſect are moſtly known among the country people by the name of *wornuls*, *wormuls*, or *warbles*, or more properly *bots*.

* It has been doubted by Linnæus, and ſome other writers (I know not why), whether it ſettles in depoſiting its egg. The evident ſuffering of the animal ſufficiently evinces this: perhaps the remark was intended for the Œ. *Equi*.

## *Of the* OESTRUS *Equi.*

THE *larva* of this fly is that which is very commonly found in the ſtomach of horſes, and is repreſented in fig. 7.

Theſe *larvæ* attach themſelves to every part of the ſtomach, but are generally moſt numerous about the *pylorus;* and are ſometimes, though much leſs frequently, found in the inteſtines.

Their numbers in the ſtomach are very various, often not more than half a dozen, at other times more than a hundred, and, if ſome accounts might be relied on, even a much greater number than this. They hang moſt commonly in cluſters, being fixed by the ſmall end to the inner membrane of the ſtomach, which they adhere to by means of two ſmall hooks, or *tentacula.* Of theſe a repreſentation conſiderably enlarged is ſeen in fig. 22.

When they are removed from the ſtomach they will attach themſelves to any looſe membrane, and even to the ſkin of the hand. For this purpoſe they ſheath or draw back the hooks almoſt entirely within the ſkin, till the two points come cloſe to each other; they then preſent them to the membrane; and keeping them parallel till it is pierced through, they expand them in a lateral direction, and afterwards, by bringing the points downwards towards themſelves, they include a ſufficient piece of the membrane, and remain firmly fixed for any length of time, without requiring any farther exertion.

Theſe hooks, the better to adapt them to this purpoſe, appear to have a joint near their baſe. The *larvæ* of Œ. *hæmorrhoidalis* and *ovis*, and probably all thoſe which feed on the mucous membranes lining the internal canals of the body, are alſo furniſhed with theſe *tentacula;* whilſt thoſe *larvæ* which inhabit beneath

neath the ſkins of various animals will be found univerſally without them *.

The body of the *larva* is compoſed of eleven ſegments, all of which, except the two laſt, are ſurrounded with a double row of horny briſtles directed towards the truncated end, and are of a reddiſh colour, except the points, which are black. Theſe *larvæ* evidently receive their food at the ſmall end by a longitudinal aperture, which is ſituated between the two hooks or *tentacula*. See fig. 22, a. The lips of this aperture appear ſomewhat hard, horny, and irregular.

Their food is probably the chyle, which, being nearly pure aliment, may go wholly to the compoſition of their bodies without any excrementitious reſidue, though on diſſection the inteſtine is found to contain a yellow or greeniſh matter, which is derived from the colour of the food, and ſhews that the chyle, as they receive it, is not perfectly pure.

* They are wanting in the Œ. *Tarandi*, whoſe *larva* I have ſeen; and alſo in a new and ſingular ſpecies, which inhabits beneath the ſkin of the rabbits and hares of Georgia in America. This ſpecies having never been deſcribed by any writer I am acquainted with, I take this opportunity of introducing a deſcription of it, from a ſpecimen in the excellent cabinet of Mr. Francillon.

Œ. *cuniculi.* Niger, alis fuſcis, thorace ad medium nigro, poſtice, abdominiſque baſi pilis flaveſcentibus.

*Habitat* in Georgia Americana.

*Deſcr.* Œ. bovino noſtro bis major, caput nigrum, oculis fuſcis, fronte veſiculari porrectâ. *Thorax* antice nigricans, angulo obtuſo ad medium; poſtice, lateribus, ſcutelloque flavis. *Abdomen* nigrum baſi et lateribus ſegmentorum flavis. *Alæ* glauceſcentes ſeu fuſcæ. *Corpus* ſubtus nigrum. Pedes nigri.

*Larva* fuſca undique muricata aculeis minutiſſimis, ſub cute leporum et affinium habitat.

From the extraordinary ſize of this *Oeſtrus*, I ſhould be led to imagine it was originally deſtined to infeſt ſome much larger animal, which perhaps may be extinct.

The ſlowneſs of their growth and the purity of their food muſt occaſion what they receive in a given time to be proportionably ſmall; from whence probably ariſes the extreme difficulty there is found in deſtroying them by any medicine or poiſon thrown into the ſtomach. After opium had been adminiſtered to a horſe labouring under a caſe of locked jaw for a week, in doſes of one ounce every day, on the death of the animal I have found the bots in the ſtomach perfectly alive. Tobacco has been employed in much larger quantities in the ſame complaint, and has been alſo longer continued without deſtroying them. They are alſo but rarely affected by the draſtic purgatives which bring away in abundance the *Teniæ* and *Aſcarides*.

I do not apprehend they are ſo very injurious to the horſes as is generally conceived. When removed from the ſtomach a deep impreſſion remains where they adhered; but whether they ever irritate it ſo as to bring on a fatal ſpaſm of the ſtomach itſelf, or of the *pylorus*, or, by collecting round this paſſage, prevent the food from entering the inteſtine, has, I believe, never been inveſtigated with ſufficient accuracy. The ignorant ſurpriſe of farriers on opening the ſtomach after death, and being preſented with ſo ſingular an appearance as the bots, has, without doubt, very often occaſioned the death to be attributed to theſe, though it is certain but few horſes on our commons can eſcape them. At the extremity of the truncated end are ſeen two protuberant kind of lips, applied to each other. See fig. 7, a. When theſe unfold, or are removed with the knife, a plate of horny or cartilaginous conſiſtence is ſeen, having ſix ſemicircular lines, with their points oppoſed to each other. See fig. 23. Theſe lines are rough, and made up of alternate depreſſed and elevated ſpots of black and white.

Through this plate the air is admitted to fill the air tubes; and in moſt

moſt of the *larvæ* of this claſs there are two diſtinct plates for this purpoſe, one on each ſide.

That the air is admitted by theſe means, is proved by immerſing one of the *larvæ* of this claſs of inſects in a veſſel of water; when a bubble may be extricated by preſſure, and may be diſtinctly ſeen forming in the water, and on removing the preſſure the bubble will be again entirely re-abſorbed.

In the *larvæ* of the *Muſca tenax* and *pendula*, inſtead of a horny plate of this kind, there is provided a ſlender tail of conſiderable length, with a perforated cartilaginous tube paſſing through it; and the extremity of this tube is elevated above the ſurface of the putrid water in which they live, and conveys air to the *larva* beneath.

On opening the body of the bot, and removing the gelatinous matter, the air tubes are ſeen of a ſplendid ſilvery colour, as though injected with the pureſt mercury. They remain diſtended by their own inherent elaſticity, and are filled with air to their minuteſt ramifications. Their appearance is ſingularly beautiful, eſpecially if the bot be alive, or recently dead. This glittering appearance ariſes from the air being ſeen through the ſemitranſparent, refracting coats of the veſſel.

In this ſpecies the principal trunks of the air veſſels are no leſs than ten in number, which by diſſection are found to open with the large ends (ſee fig. 26, a) into one common reſervoir beneath the cartilaginous plate: this being removed with a knife, exhibits the mouths of the tubes as they are arranged at fig. 24. The branches proceeding from theſe veſſels terminate on the viſcera and ſkin, in a ſimilar manner to the air veſſels of the former ſpecies.

Two conſiderable trunks or tubes could be traced till they terminated in the two ſmall prominent points on the edge of the firſt ſegment. See fig. 22, a.

The

The lips at the obtuſe end of the bot ſeem deſigned to prevent the gaſtrick and other ſecretions of the ſtomach, aſſiſted by its heat and action, from injuring the cartilaginous plate; for we do not diſcover any apparatus of this nature to cover theſe plates in the Œ. *Ovis* or *Bovis*, which, though allied in all other reſpects, are not expoſed to theſe circumſtances.

Theſe lips are found, on opening them, to be mere membranous bags, filled with a watery fluid; a convincing proof they do not form any part in the future inſect, and are merely for the convenience of the *larva*.

Reſpiration appears to be the office of theſe air canals, which are the lungs of the *larva*; and, conſidered in this point of view, they are much larger than the reſpiratory organs of any other animal: which is the more extraordinary, if the purpoſe of reſpiration in animals be the production of animal heat, as the later chemiſts ſuppoſe, this being altogether unneceſſary to *larvæ* that are ſupplied ſo abundantly with it from the high temperature of their reſidence in the living ſtomach, and have a greater ſhare of it than is probably pleaſant to them; nor can theſe organs be formed for the purpoſes of the future inſect, ſince they cannot be detected in either the *chryſalis* or fly.

I have ſince found that air veſſels of a ſimilar ſtructure may be detected in the *larvæ* of moſt inſects, as well in thoſe that are not expoſed to any extraordinary temperature as thoſe that are; they are therefore not conſtructed with any view to theſe ſingular ſituations.

From the ſuperior magnitude of the reſpiratory organs in moſt of the *larvæ* of inſects, one ſhould be almoſt led to imagine that the reſpiration in all animals was more intimately connected with the reception of food, and the converting it into living matter, than any other deſign.



In

In corroboration of this we may obſerve, that while the reſpiratory organs are ſo large in the *larva*, they are remarkably ſmall in the perfect inſect, which alſo, in general, has occaſion for very little food.

Perhaps the ſuperior ſize of the air veſſels of the bot, compared with the *larvæ* of other inſects, ariſes from the greater rarefaction and impurity of the air it is expoſed to in the ſtomach, which may render a larger portion of it neceſſary. The remaining undecompoſed air in the air tubes appears to paſs out by means of the *ſpiracula* principally, and alſo perhaps by the two horny points obſervable on the firſt ſegment. See fig. 22, a.

Upon this ſubject it may not be improper to notice the air veſſels of the *larva* of the *Muſca pendula*, which are conſtructed in a very different way from any others I have ſeen. The two principal trunks in this *larva* are made up of ſemicircular cartilaginous rings or fibres, which are diſpoſed in a ſpiral direction, ſo as to form the tube. It is evident by this ſtructure, that the area of the tube may be entirely obliterated, and the ſides be brought into contact.

The convenience attending this ſtructure, to a *larva* living in putrid fluids of conſiderable depth, appears to be, that beſide its uſe in reſpiration, it may ſerve the ſame office as the air bladder in fiſhes, regulating by its contraction, or expanſion, the denſity or rarity of the included air, and conſequently the deſcent or aſcent of the *larva* in thoſe fluids.

The *larvæ* of the Œ. *Equi* attain their full growth about the latter end of May, and are coming from the horſe from this time to the latter end of June, or ſometimes later. On dropping to the ground they find out ſome convenient retreat, and change to the *chryſalis*; and in about ſix or ſeven weeks the fly appears.

Though this is by far the moſt common ſpecies of the genus, I have

have not been able to obtain a *chryſalis* of it for delineation; but it nearly reſembles that of Œ. *hæmorrhoidalis*, except in ſize.

There is a conſiderable difference between the male and female fly: a delineation of each is given, fig. 8 and 9; and to prevent unneceſſary repetition, they are deſcribed, together with the other ſpecies, at the concluſion of the paper.

Perhaps it will be hardly neceſſary to apologize to the Society for the alteration of the Linnæan name *Bovis* to that of *Equi*, as the former, if retained, would continue to convey a very erroneous idea; and it would, without doubt, have been changed by Linnæus himſelf, had he been in poſſeſſion of theſe facts, who conſidered trivial names not as fetters to the ſcience, but as temporary conveniences, to be altered or retained as time and further diſcovery might prove them to be juſt. On the other hand, wanton and unneceſſary alteration, on ſlight pretences, certainly cannot be too much reprobated.

The mode purſued by the parent fly to obtain for its young a ſituation in the ſtomach of the horſe is truly ſingular, and is effected in the following manner:—When the female has been impregnated, and the eggs are ſufficiently matured, ſhe ſeeks among the horſes a ſubject for her purpoſe, and approaching it on the wing, ſhe holds her body nearly upright in the air, and her tail, which is lengthened for the purpoſe, curved inwards and upwards: in this way ſhe approaches the part where ſhe deſigns to depoſit the egg; and ſuſpending herſelf for a few ſeconds before it, ſuddenly darts upon it, and leaves the egg adhering to the hair: ſhe hardly appears to ſettle, but merely touches the hair with the egg held out on the projected point of the abdomen. The egg is made to adhere by means of a glutinous liquor ſecreted with it. She then leaves the horſe at a ſmall diſtance, and prepares a ſecond egg, and, poiſing

poiſing herſelf before the part, depoſits it in the ſame way. The liquor dries, and the egg becomes firmly glued to the hair: this is repeated by various flies till 4 or 500 eggs are ſometimes placed on one horſe.

The horſes, when they become uſed to this fly, and find it does them no injury, as the *Tabani* and *Conopes*, by ſucking their blood, hardly regard it, and do not appear at all aware of its inſidious object.

The ſkin of the horſe is always thrown into a tremulous motion on the touch of this inſect, which merely ariſes from the very great irritability of the ſkin and cutaneous muſcles at this ſeaſon of the year, occaſioned by the continual teaſing of the flies, till at length theſe muſcles act involuntarily on the ſlighteſt touch of any body whatever.

The inſide of the knee is the part on which theſe flies are moſt fond of depoſiting their eggs, and next to this on the ſide and back part of the ſhoulder, and leſs frequently on the extreme ends of the hairs of the mane. But it is a fact worthy of attention, that the fly does not place them promiſcuouſly about the body, but conſtantly on thoſe parts which are moſt liable to be licked with the tongue; and the *ova* therefore are always ſcrupulouſly placed within its reach. Whether this be an act of reaſon or of inſtinct, it is certainly a very remarkable one. I ſhould ſuſpect, with Dr. Darwin *, it cannot be the latter, as that ought to direct the performance of any act in one way only.

Whichever of theſe it may be, it is, without doubt, one of the ſtrongeſt examples of pure inſtinct, or of the moſt circuitous reaſoning any inſect is capable of. The eggs thus depoſited

* Zoonomia. *Vid.* Chapter on Inſtinct.

I at firſt ſuppoſed were looſened from the hairs by the moiſture of the tongue, aided by its roughneſs, and were conveyed to the ſtomach, where they were hatched; but on more minute ſearch I do not find this to be the caſe, or at leaſt only by accident; for when they have remained on the hairs four or five days they become ripe, after which time the ſlighteſt application of warmth and moiſture is ſufficient to bring forth in an inſtant the latent *larva*. At this time, if the tongue of the horſe touches the egg, its *operculum* is thrown open, and a ſmall active worm is produced, which readily adheres to the moiſt ſurface of the tongue, and is from thence conveyed with the food to the ſtomach. If the egg itſelf be taken up by accident, it may paſs on to the inteſtinal canal before it hatches; in which caſe its exiſtence to the full growth is more precarious, and certainly not ſo agreeable, as it is expoſed to the bitterneſs of the bile.

I have often, with a pair of ſciſſars, clipped off ſome hairs with the eggs on them from the horſe, and on placing them in the hand, moiſtened with ſaliva, they have hatched in a few ſeconds. At other times, when not perfectly ripe, the *larva* would not appear, though held in the hand under the ſame circumſtances for ſeveral hours; a ſufficient proof that the eggs themſelves are not conveyed to the ſtomach.

It is fortunate for the animals infeſted by theſe inſects that their numbers are limited by the hazards they are expoſed to. I ſhould ſuſpect near a hundred are loſt for one that arrives at the perfect ſtate of a fly. The eggs, in the firſt place, when ripe, often hatch of themſelves, and the *larva*, without a *nidus*, crawls about till it dies; others are waſhed off by the water, or are hatched by the ſun and moiſture, thus applied together.

When in the mouth of the animal they have the dreadful ordeal

of the teeth and maſtication to paſs through. On their arrival at the ſtomach, they may paſs, mixed with the maſs of food, into the inteſtines; and, when full grown, on dropping from the *anus* to the ground, a dirty road or water may receive them.—If on the commons, they are in danger of being cruſhed to death, or of being picked up by the birds who ſo conſtantly for food attend the footſteps of the cattle. Such are the contingencies by which Nature has wiſely prevented the too great increaſe of their numbers, and the total deſtruction of the animals they feed on.

I have once ſeen the *larva* of this *Oeſtrus* in the ſtomach of an aſs: indeed there is little reaſon to doubt their exiſtence in the ſtomachs of all this tribe of animals.

The perfect fly but ill ſuſtains the changes of weather; and cold and moiſture, in any conſiderable degree, would probably be fatal to it. Theſe flies never purſue the horſe into the water. This averſion I imagine ariſes from the chilneſs of that element, which is probably felt more exquiſitely by them, from the high temperature they had been expoſed to during their *larva* ſtate. The heat of the ſtomach of the horſe is much greater than that of the warmeſt climate, being about 102 degrees of Fahrenheit, and in their fly ſtate they are only expoſed to 60, and from that to about 80 degrees. This change, if ſuddenly applied, would, in all probability, be fatal to them; but they are prepared for it, by ſuffering its firſt effects in the quieſcent and leſs ſenſible ſtate of a *chryſalis*. I have often ſeen this fly during the night-time, and in cold weather, fold itſelf up, with the head and tail nearly in contact, and lying apparently in a torpid ſtate, though in the middle of ſummer.

It is worthy of remark, that the greater part of the *ova* depoſited by this fly, are taken up in conſequence of the irritations of other flies, as the *Conopes*, *Tabani*, and *Muſcæ*, who, by ſettling on the ſkin,

occaſion the horſe to lick himſelf in thoſe parts, and thus receive the *larvæ* on the tongue and lips; and a horſe that has had no *ova* depoſited on him, may yet have the bots by performing the friendly office of licking another horſe that has. The eggs on the ſhoulder are particularly well diſpoſed for being received in this way.

Whether theſe *larvæ* can exiſt in the ſtomach of a carnivorous animal I am not certain. I gave upwards of a hundred eggs (proved by trials to be ripe, and containing a living caterpillar) to a cat in milk, at various times; and on deſtroying her at the end of two months after the firſt portion had been given, no traces of them in the ſtomach or inteſtines could be diſcovered.

The ſmall end of the *chryſalis*, in all the ſpecies of this genus, contains the head of the fly, the contrary being the caſe with almoſt all other inſects.

## *Of the* OESTRUS *hæmorrhoidalis.*

THE *larva* of this inſect needs not to be particularly deſcribed, as it reſembles in almoſt every reſpect that of the Œ. *Equi*. Its habits are the ſame, being ſeen in the ſtomach of the horſe occupying the ſame ſituation as thoſe of the Œ. *Equi*, from which they can only be diſtinguiſhed by their ſmaller ſize and greater whiteneſs. See fig. 10.

On diſſection it is found to poſſeſs ſimilar air tubes and alimentary canal. When it is ripe, and has paſſed through the inteſtines, its ſkin becomes of a greeniſh-red hue. It generally aſſumes the *chryſalis* ſtate in about two days after leaving the *rectum*, and is then of a deep-red colour. See fig. 11.

The *larvæ* of this and the preceding ſpecies may be obtained from the horſe from the beginning of June to the middle of July, being found hanging to the extremity of the *rectum*. None of theſe *larvæ*

ever appear to change their ſkin. If they did, it is probable they would loſe their hold, as the hooks are principally connected with the ſkin, and ſeparate with it by maceration, leaving only an indentation where they were lodged.

Theſe *larvæ*, being forcibly ſqueezed, contract themſelves into a ſmaller ſpace, and become very hard. It is probable they in this way reſiſt the violent preſſure they muſt occaſionally ſuſtain, from the weight of the food and the actions of the ſtomach, and in paſſing through the inteſtines and the *ſphincter ani*.

After remaining in the *chryſalis* ſtate about two months, the fly appears. See fig. 12 and 13,—the male and female,—and their deſcription in the ſequel of the paper.

This ſpecies may ſtill retain the name of *hæmorrhoidalis*, without any impropriety, not from the ſuppoſed hiſtory of its entering the *anus*, but from the termination of the *abdomen* being red, Linnæus having generally choſen to diſtinguiſh the inſects ſo marked by that name; alſo from their reſembling the *hæmorrhoids* or *piles*, while hanging to the extremity of the *rectum* *.

It ſeems hitherto to have been generally believed among naturaliſts, that the female fly enters the *anus* of the horſe in a very extraordinary manner, to depoſit its eggs †.

* The idea entertained by the Romans of this appearance is truly ſingular: Hujuſmodi paſſionis ſignum eſt (morbus coriaginoſus) cum invenitur humor in ano fabæ coctæ ſimilis: eſt namque ſanies ex illis vulneribus quæ beſtiolæ intrinſecus fecerunt. *Flavius Vegetius de Arte Veterinaria, ed. Manheim.* p. 63.

† Reaumur, tom. iv. p. 543, relates this circumſtance on the authority of Dr. Gaſpari. From the account of its getting beneath the tail, I ſhould ſuſpect the fly he ſaw was the *Hippobeſca equina*, which frequently does this. Its getting within the *rectum* appears to have been additional. That a fly might depoſit its eggs on the verge of the *anus* is not impoſſible, though we know no inſtance of it.

The

The objections to this idea are—that the *anus* is rather cloſed than opened by any irritation externally applied.—The fly would be cruſhed in attempting to paſs the *ſphincter* of a horſe's *rectum*; and having no means of holding while depoſiting its eggs, it would be quickly evacuated with the dung.—The whole of the *ova*, to the amount of 2 or 300, muſt be depoſited in one horſe, as it is impoſſible, if the fly ſurvived, that it could undergo this puniſhment a ſecond time, for the heat and moiſture of the *rectum* would at leaſt deſtroy its wings.

I mention theſe objections, not as merely relating to this ſpecies, but that it may not be credited of the Œ. *naſalis*, or indeed of any of them, that they really enter the body of the animal to obtain for their young a ſituation there.

I have not ſeen any writer who has deſcribed the mode in which this fly depoſits its *ova*; which having had repeated opportunities of ſeeing, I can ſpeak of with certainty.

The part choſen by this inſect for this purpoſe is the lips of the horſe, which is very diſtreſſing to the animal from the exceſſive titillation it occaſions; for he immediately after rubs his mouth againſt the ground, his fore-legs, or ſometimes againſt a tree; or if two are ſtanding together they often rub themſelves againſt each other. At the ſight of this fly the horſe appears much agitated, and moves his head backwards and forwards in the air, to baulk its touch, and prevent its darting on the lips; but the fly, watching for a favourable opportunity, continues to repeat the operation from time to time; till at length finding this mode of defence inſufficient, the enraged animal endeavours to avoid it by galloping away to a diſtant part of the field. If it ſtill continues to follow and teaſe him, his laſt reſource is in the water, where the *Oeſtrus* never is obſerved to follow him.

The

The teaſing of other flies will ſometimes occaſion a motion of the head ſimilar to this; but it ſhould not be miſtaken for it, as it is never in any degree ſo violent as during the attack of the *Oeſtrus*.

At other times this *Oeſtrus* gets between the fore-legs of the horſe whilſt he is grazing, and thus makes its attack on the lower lip: the titillation occaſions the horſe to ſtamp violently with his fore-foot againſt the ground, and often ſtrike with his foot as though aiming a blow at the fly. They alſo ſometimes hide themſelves in the graſs; and as the horſe ſtoops to graze they dart on the mouth or lips, and are always obſerved to poiſe themſelves during a few ſeconds in the air, while the egg is preparing on the point of the *abdomen*.

When ſeveral of theſe flies are confined in a cloſe place, they have a particularly ſtrong fuſty ſmell; and I have obſerved both ſheep and horſes, when teaſed by them, to look into the graſs and ſmell to it very anxiouſly; and if they by theſe means diſcover the fly, they immediately turn aſide and haſten to a diſtant part of the field.

The eggs of this ſpecies appear of a darker colour than the former, and the circumſtances attending their paſſage to the ſtomach I am unacquainted with.

The *larva* of the Œ. *hæmorrhoidalis*, as well as the former ſpecies, appears to have been termed among the Romans, *Coſſus* *, which ſeems to have been a general expreſſion for any kind of ſoft imperfect animal, and to have been very analogous, and as extenſively applied as the word *grub* is at preſent in the Engliſh language.

The learned Charlton (*Onomaſticon Zoicon*, p. 56), and afterwards Dr. Johnſon (ſee Dictionary), have conſidered *aſcarides* as the ſyno-

* Vide *Flavius Vegetius Renatus de Arte Veterinaria, p.* 62, 64, 69, *ed. Mank.*

nymous

nymous term among the ancients for the bots: that term has always been applied to the thin ſmooth worms of the inteſtines, but, I apprehend, never to theſe.

Our anceſtors imagined that poverty, or improper food, engendered theſe animals, or that they were the offspring of putrefaction. In Shakſpeare's Henry the Fourth, Part I, the oſtler at Rocheſter ſays: "Peaſe and beans are as dank here as a dog, and "that is the next way to give poor jades the bots;" and one of the misfortunes of the miſerable nag of Petruchio is, that "he is "ſo begnawn with the bots."

When the animal is kept from food the bots are alſo, and are then, without doubt, the moſt troubleſome; whence it was very naturally ſuppoſed that poverty or bad food was the parent of them.

They alſo appear to have gone formerly in this country by the name of *truncheons*. In Blundeville, who wrote on farriery during the reign of Queen Elizabeth, we have the following paſſage:— "The ſecond ſort of worms have great heads and ſmall long tails, "like a needle, and be called bots: the third be ſhort and thick, "like the end of a man's little finger, and be called truncheons."

## *Of the* OESTRUS *veterinus.*

THIS ſpecies ſeems to have been only well deſcribed by Linnæus, who called it *naſalis*, from an idea of its entering the noſtrils of the horſe to depoſit the eggs*, which it could not well do without deſtroying the wings, and is therefore probably as much a fable as the "*mirè per anum intrans*" of the Œ. *hæmorrhoidalis*. I have ſeen four

* Habitat in equorum fauce per nares intrans. *Linn. Syſt. Nat.* 2. p. 969.

*chryſalides*

*chryſalides* of this fly, which I uniformly found under the dung of horſes. They produced the flies, male and female, repreſented at fig. 18 and 19; but not having at that time any idea of writing on this ſubject, I unfortunately threw away the *chryſalides*. The *larva* I am at preſent unacquainted with; but if it inhabited the *fauces* of the horſe, it would produce ſuch troubleſome ſymptoms as could not eaſily eſcape the notice of thoſe whoſe buſineſs it is to attend to the diſeaſes of cattle. Such a diſeaſe has, however, never been deſcribed by any writer on this ſcience; nor, after an extenſive opportunity both in the dead and living ſubject of obſerving them, have I ever ſeen a bot in the *fauces*. Perhaps the bots of the ſtomach having crawled to the *fauces* in ſearch of food might have given riſe to this idea, or they may even have accidentally bred there; for there is little doubt theſe animals can live in any part whatever of the alimentary canal.

I am induced to ſuſpect they inhabit the ſtomach, as well as the two former ſpecies; but of this we muſt at preſent remain in uncertainty, as well as of the manner in which this ſpecies depoſits its eggs.

I have given it the name of *veterinus*, becauſe beaſts of burden are particularly ſubject to it, in preference to the erroneous one of *naſalis*.

## *Of the* OESTRUS *Ovis.*

I PROCURED about the middle of June ſome full-grown *larvæ* of the Œ. *Ovis*, from the inſide of the cavities of the bone which ſupports the horns of the ſheep. See fig. 14.

They are nearly as large as thoſe of the Œ. *Equi*, of a delicate white colour, flat on the under ſide, and convex on the upper; having no ſpines at the diviſions of the ſegments, though they are provided with *tentacula* at the ſmall end. The other end is truncated with a

prominent ring or margin, which ſerves the ſame purpoſe in an inferior degree as the lips of the Œ. *Equi* and *hæmorrhoidalis*, by occaſionally cloſing over, and cleaning the horny plate. When this margin opens after cloſing over the plate, it occaſions frequently a ſlight ſnap from the ſudden admiſſion of the air.

When young theſe *larvæ* are perfectly white and tranſparent, except the two horny plates, which are black. As they increaſe in ſize the upper ſide becomes marked with two tranſverſe brown lines on each ſegment, and ſome ſpots are ſeen on the ſides.

They move with conſiderable quickneſs, holding with the *tentacula* as a fixed point, and drawing up the body towards them. On the under ſide of the *larva* is placed a broad line of dots, which, on examination with glaſſes, appear to be rough points, ſerving perhaps the double purpoſe of aſſiſting their paſſage over the ſmooth and lubricated ſurfaces of theſe membranes, and of exciting alſo a degree of inflammation in them where they reſt, ſo as to cauſe a ſecretion of lymph or pus for their food.

I have moſtly found theſe animals in the horns and frontal ſinuſes, though I have remarked that the membranes lining theſe cavities were hardly at all inflamed, while thoſe of the maxillary ſinuſes were highly ſo. From this I am led to ſuſpect they inhabit the maxillary ſinuſes, and crawl, on the death of the animal, into theſe ſituations in the horns and frontal ſinuſes.

The breeds of theſe, like the Œ. *Bovis*, do not appear confined to any particular ſeaſon; for quite young and full-grown *larvæ* may be found in the ſinuſes at the ſame time.

When full-grown they fall through the noſtrils, and change to the *pupa* ſtate, lying on the earth, or adhering by the ſide to a blade of graſs. See fig. 15.

The fly burſts the ſhell of the *pupa* in about two months. See fig.

fig. 16 and 17. The manner in which this ſpecies depoſits its *ova* has, I believe, not been deſcribed; nor is it eaſy to ſee, though cloſe to the animal at the time, exactly in what way this is accompliſhed, owing to the obſcure colour and rapid motion of the fly, and the extreme agitation of the ſheep; but the motions of the ſheep afterwards, and the mode of defence it takes to avoid it, can leave but little doubt that the egg is depoſited on the inner margin of the noſtril.

The moment the fly touches this part of the ſheep, they ſhake their heads, and ſtrike the ground violently with their fore-feet; at the ſame time holding their noſes cloſe to the earth they run away, looking about them, on every ſide, to ſee if the fly purſues: they alſo ſmell to the graſs as they go, leſt one ſhould be lying in wait for them. If they obſerve one, they gallop back, or take ſome other direction. As they cannot, like the horſes, take refuge in the water, they have recourſe to a rut, or dry duſty road, or gravel pits, where they crowd together during the heat of the day, with their noſes held cloſe to the ground, which renders it difficult for the fly conveniently to get at the noſtril.

Obſervations on theſe flies are beſt made in warm weather, and during the heat of the day, when, by driving the ſheep from their retreats to the graſs, the attack of the fly and the emotions of the ſheep are eaſily obſerved.

I imagine the noſtril, from repeated attacks, and the conſequent rubbing againſt the ground, becomes highly inflamed and ſore, which occaſions their touch to be ſo much dreaded by the ſheep.

From the difficult and very precarious mode this ſpecies and the *hæmorrhoidalis* purſue in depoſiting their eggs, they cannot ſucceſsfully depoſit more than half of them.

*General Obſervations on the Oeſtri.*

HAVING traced theſe animals ſeparately through their various changes, it may not be improper to conclude the account by a general review of their good or ill effects on the animals that are ſubject to them.

Though the attention of naturaliſts is at preſent chiefly occupied with the formation of a nomenclature and deſcriptions to every object of the ſcience; yet this, though difficult and highly important, is not ſo much the ultimate aim of natural hiſtory as a knowledge of their economy and properties; as from theſe we are taught the moſt effectual means of avoiding the conſequences of the injurious, and of protecting ſuch as can be uſefully applied to the purpoſes of mankind.

If, after mature enquiry, the exiſtence of the *Oeſtri* ſhould be proved in a greater degree injurious than any ſervice they can afford, their numbers might be conſiderably reduced, and a total extirpation of ſome of the ſpecies would, I am diſpoſed to believe, be not altogether impracticable.

The injury derived from their depredations is principally felt by the tanners, whoſe hides are often ſo perforated by theſe animals as to be conſiderably damaged thereby; and the loſs of a horſe or a ſheep may ſometimes perhaps be occaſioned by the exiſtence of the other ſpecies.

If it were deſirable to leſſen their numbers, the following, I apprehend, would be the moſt ſucceſsful means:

The *larva* of the Œ. *Bovis*, which breeds in the backs of the horned cattle, is ſo conſpicuous that it is more eaſily deſtroyed than the others: the injection of any corroſive liquor into the *ſinus*

would kill it; or by puncturing the *larvæ* with a hot needle, introduced through the apertures in the ſkin, or even by ſimple preſſure, they may be deſtroyed, afterwards extracting them, or leaving them to ſlough away, which I have frequently obſerved they do when cruſhed by a blow from the horn of the beaſt, or by any other accident, without any material injury to the animal. A man employed for this purpoſe might, in half a day, in this manner deſtroy every bot on a large common.

In regard to the Œ. *Equi* and *hæmorrhoidalis*, thoſe who have horſes which have been much out to graſs the preceding year, in countries where theſe flies are prevalent, might conſiderably diminiſh their numbers by examining the horſes occaſionally for the bots during the months of May and June, when they will be found hanging to the extremity of the *rectum*, where they remain for ſome time before they fall to the ground.

The deſtruction of a ſingle one at this ſeaſon of the year is not only the death of an individual and its effects, but the almoſt certain deſtruction of a numerous family; at the ſame time it is alſo highly uſeful in preventing the irritation which the ſpines of the bot occaſion to the *anus*. If the horſe is uſed on the road while the bot is adhering to this part, the irritation becomes diſtreſſing, and cauſes him to move very awkwardly and ſluggiſh, as though tired; and if ſeverely beaten he ſoon relapſes again into the ſame awkward action. As this moſt frequently happens during warm weather, it is in general attributed to mere lazineſs.

Theſe ſymptoms I have been a witneſs to ſeveral times, to the ſevere chaſtiſement of the horſe and vexation of the rider: on the removal of the bot the cure is inſtantaneous.

If this mode of removing them was generally complied with, but few could eſcape, and their numbers would be very much reduced;

and

and thoſe who wiſh to obtain them for cabinets of natural hiſtory, or for examination, will alſo find this the moſt effectual way.

We know of no medicine that will detach them from the ſtomach or inteſtines, though there are not wanting abundance of infallible noſtrums among the very numerous profeſſors of this art.

Another both eaſy and effectual mode, at leaſt for the Œ. *Equi*, is to deſtroy the eggs which are depoſited on the hairs of the horſe, and are eaſily ſeen and removed by a pair of ſciſſars, or by means of a bruſh and warm water.

In the ſheep it will be much more difficult to prevent or deſtroy them by any of theſe means; particularly if they are ſeated in the maxillary ſinuſes: in this caſe trepanning would be inſufficient, as they would probably be concealed among the convolutions of the turbinated bones.

Perhaps the removal of the ſheep to a diſtant paſture, during the months of June and July, while greateſt part of the bots are yet on the ground in the *chryſalis* ſtate, and not bringing them on the paſture again till the ſetting in of the winter, would be the means of deſtroying them moſt effectually; and if repeated for two or three years ſucceſſively, when they are particularly troubleſome, the farmers might eventually find their account in it.

On the other hand, notwithſtanding the apparently unneceſſary exiſtence and cruel effects of the *Oeſtri*, they are probably not altogether without an uſe, or were deſigned by Providence to add, without a recompenſe, to the numerous ſufferings of theſe uſeful and laborious creatures.

A phyſiological view of their effects will, perhaps, beſt juſtify their exiſtence, and ſave them from ſuch an imputation.

The *larvæ* of the *Oeſtri*, when applied under proper reſtrictions, and to a certain extent, may be of greater utility than from our preſent

preſent very limited knowledge of them we are able to diſcover; but we may venture to remark, that their effect in keeping up a conſiderable degree of irritation in the membranes on which they are ſituated, may, perhaps not inaptly, be compared to that of a perpetual iſſue or bliſter. Nor is there wanting abundant proof of the utility of local irritations in preventing the acceſs, as well as in curing diſorders. We often ſee a formidable diſeaſe quickly removed by bliſtering the ſkin, or by irritating the mucous membrane of the ſtomach or inteſtines by a vomit or purge. The appearance of exanthematous eruptions on the ſkin, and the formation of local abſceſſes, from the ſame cauſe of partial irritation, often relieve a general diſorder of the ſyſtem. The mucous membranes and the ſkin poſſeſs this power when irritated in the moſt eminent degree, and to theſe the *larvæ* of the *Oeſtri* are applied. Irritating the membranes of the ſtomach in other animals would excite nauſea and vomiting; but the horſe not poſſeſſing this power, his ſtomach is peculiarly fitted for the ſtimulus of ſuch inhabitants.

It has alſo been remarked in hoſpitals, that a patient afflicted with a wound, ulcer, or other ſevere local complaint, is not ſo ſuſceptible of the contagion of a fever or other general diſorder.

How far the acceſs of thoſe dreadful diſorders which ſometimes ariſe of themſelves in cattle and horſes, and afterwards become contagious, as the murrain, glanders, farcy, &c. may be prevented by theſe peculiar irritations, it will not be eaſy to diſcover; nor whether that ſingular tendency or diſpoſition in the horſe to inflammatory complaints, as the *caligo* of the eyes, termed moon-blindneſs, inflammations of the lungs and of the bones, as ſpavins, ſplints, &c. may be in any degree checked or ſubdued by the application of theſe local *ſtimuli*.

In confirmation of this ſuggeſtion I may remark (although I am aware.

aware other reaſons may be alſo aſſigned for it), that thoſe horſes which are not expoſed to the bots, more frequently are infected with the glanders, farcy, &c. as thoſe of the army, poſt-coaches, poſt-waggons, and dray-horſes, theſe being rarely ſpared, from the nature of their work, to graze on the commons, and thus be expoſed to receive them.

If, after a more minute reſearch into their effects on the ſyſtem, the utility of theſe native *ſtimuli* of animals ſhould be eſtabliſhed, and, like the leech, or the *cantharides*, they ſhould be called in to the aid of veterinary medicine, it would not be impracticable to adminiſter them artificially by means of their *ova*.

If the ſtimulus is conſidered as of too gentle a nature, it is in ſome meaſure atoned for by its permanency, and the unlimited power of increaſing their numbers; at leaſt, by the adminiſtration of them in this way, we might accurately aſcertain their real effects, and whether they are ſo fatal as has been imagined.

Linnæus has alſo obſerved of the *pediculus*, "rodendo caput "exciat achores, apud puerulos voraces incarceratos, indeque ſtru- "moſos, ſicque præſervat a coryza, tuſſi, cæcitate, epilepſia," &c.

In the ſame way the worms in children, I am induced to believe, are wholeſome to them in a certain quantity, by conſtantly irritating the membranes of the inteſtines, and preventing the acceſs of worſe diſorders. But however uſeful a few of theſe natural *ſtimuli* of animals may be, the increaſe of their numbers, by producing bad conſequences, ſhould at all times be prevented.

The ſheep are particularly ſubject to diſorders attended with *vertigo*, probably ariſing from an affection of the brain; and the *larvæ* of the Œ. *Ovis* are certainly very favourably ſituated on the neighbouring membranes of the maxillary ſinuſes, and may perhaps tend to divert the attack of this diſorder, or render it leſs fatal.

*Remarks*

*Remarks on the generic and ſpecific Characters of the* OESTRI.

THE characters which diſtinguiſh this genus have been deſcribed ſo very oppoſitely by various writers, that I cannot well conclude this paper without taking ſome notice of theſe alſo; and having many ſpecimens of them in my poſſeſſion I was induced to diſſect them for this purpoſe. The reſult of the enquiry has been the diſcovery of characters conſiderably different from thoſe which have hitherto been aſſigned them.

The excellent *Scopoli*, conſcious of the obſcurity of this genus, has altogether omitted giving any account of them in the *Entomologia Carniolica*.

And if we except the miſtake of the Œ. *Equi* for *Bovis*, the cleareſt and beſt account of the ſpecies is ſtill to be ſeen in Linnæus.

Fabricius, in his *Species Inſectorum* *, has nearly copied the Linnæan account of the *Oeſtri*; but in a ſubſequent work of this author, the *Mantiſſa Inſectorum* †, a ſpecies under the title of *Equi* is introduced, and the ſpecies Œ. *hæmorrhoidalis* and *veterinus* are conſidered as varieties $\alpha$ and $\beta$! while the error relating to the true *Equi* is continued under the name of *Bovis*.

The moſt extenſive enumeration of the ſpecies of this genus may be ſeen in Profeſſor Gmelin's ‡ new edition of the *Syſtema Naturæ*; but the errors relating to the ſpecies have been in that work conſiderably increaſed. Inſtead of placing the *Equi* in the name of *Bovis*, as his excellent original had done, we find the *hæmorrhoidalis*; and by placing the *Equi* again in the name of *hæmorrhoidalis*, and mixing the references to each, an almoſt inextricable labyrinth of confuſion is the conſequence, while the true *Bovis* ſtill eſcapes undeſcribed, unleſs as being the ſame as *hæmorrhoidalis*.

* *Species Inſectorum*, vol. ii. p. 398. † *Mantiſſa Inſectorum*, vol. ii. p. 321.

‡ *Gmelin. Syſt. Nat.* par. iv. p. 2810.

The miſtake of *hæmorrhoidalis* for *Bovis* aroſe probably from their ſimilarity in deſcription, in which they certainly interfere very much; though no two ſpecies can be more diſtinct when ſeen together than theſe. This will ever be the bane of compilation in natural hiſtory.

It has been doubted whether theſe animals poſſeſs any mouth: Linnæus expreſsly ſays, "*Os nullum punctis tribus;*" but when the hairs are removed, which in every ſpecies very much obſcure the parts of the mouth, two clavated *palpi* are ſeen, and between them the opening of the mouth; and by laying open the veſicular or inflated part of the face, the continuation of it is viſible in the form of a membranous *hauſtellum*, which is generally coloured with ſome dark brown matter lodging on the inſide; though I confeſs, after repeated diſſections, I have not been able to trace this *hauſtellum* farther than the inſide of the inflated part of the head, where it appears to enlarge and terminate.

Fabricius has minutely deſcribed *labia* to the *hauſtellum*, and other apparatus to the mouth, which I have not been fortunate in obtaining a ſight of. At the ſame time, I cannot help being ſurpriſed that he ſhould have overlooked the *palpi*, which he expreſsly denies the exiſtence of, though tolerably viſible even without the aid of glaſſes *.

What farther circumſtances I have obſerved, in regard to the generic characters of theſe inſects, I have ſtated in the following Latin deſcriptions of them, and have alſo added there what was farther neceſſary to complete the foregoing account, with ſome alterations in the ſpecific deſcriptions of them.

I have, ſince writing the above, been enabled to collect the *ſynonyma* more fully, and to examine all the authors who have treated on this ſubject, from the invaluable library of Sir Joſeph Banks,

* *Fabricii Genera Inſectorum.*

whoſe

whoſe generous liberality in promoting uſeful reſearch by this indiſpenſable aid can never be too much admired.

The reſult of this enquiry has induced me with the greater readineſs to offer theſe remarks to the Society, from the irreconcileable deſcriptions and difficulties which will be found in the beſt writers, who have endeavoured to deſcribe the preſent genus.

I have omitted the reference to Ray, becauſe the deſcription, if meant for the Œ. *Equi*, is hardly worth preſerving. From the "*alis crebris punctis*," one ſhould ſuppoſe the *Tabanus pluvialis* was intended by this deſcription.

From the obſervations of *Wohlfarht*, "*De vermibus per nares excretis*," it appears not improbable that the Œ. *Ovis*, under a favourable opportunity, and perhaps deprived of its uſual *nidus*, had depoſited its eggs in the human noſtril, as I know of no other *larva* of this kind that could ſuſtain the temperature of that ſituation; yet the figures given of the flies obſerved by him do not much reſemble *Oeſtri* *.

J. Leonhard Fiſcher (*Diſputatio Inauguralis. Lipſiæ* 1788) has given an elaborate deſcription of the Œ. *Bovis* and *Ovis*.

In the *Anfangsgründe der Naturgeſchichte* of *Leſke*, the *larva*, tab. 9, fig. 19, is that of the *Equi*; while the fly (fig. 21) is the Œ. *Bovis*.

De Geer, who for excellent deſcriptions and general accuracy ſurpaſſes, in my opinion, nearly all the writers on theſe ſubjects, has rightly corrected Linnæus by not confounding the *Bovis* and *Equi*, but has unfortunately fallen into the error of conſidering the *Bovis* and the *hæmorrhoidalis* as the ſame. *Hiſtoire des Inſectes*, p. 297. *Genera et Species Inſectorum*, p. 192.

* Since the above was committed to the preſs, Dr. Latham has informed me of a caſe related in the firſt volume of the Medical Communications, in which inſects were removed from the *antrum maxillare* of a woman, and are evidently, as Dr. Latham has ſuppoſed, the *larvæ* of the Œ. *Bovis*.

In the *Fauna Etrusca* of Rosi, the *Bovis* is described "*alis maculatis*," which must be the *Equi*; and a species under the name of *Equi* is described "*alis immaculatis*." The *synonyma* are also mixed in a very extraordinary manner; tom. i. p. 268. In a subsequent volume he has proposed to reconcile these very various descriptions by referring them to a sexual difference.

In the *Entomologia* of Villers, the Linnæan account and references are copied, tom. iii. p. 345; and at the conclusion is very properly stated the perplexity attending the contradictory descriptions of these insects.

The references to Sultzer and Frisch, as their figures afford no idea of the insect intended, I have omitted.

Modeer, in the Swedish language, *Act. Stockholm.* 1786, p. 125, has given *Equi* for *hæmorrhoidalis*, and *hæmorrhoidalis* for *Bovis*.

Geoffroy, *Histoire des Insectes*, in the three species described by him, has nearly followed the arrangement given by Linnæus, tom. ii. p. 445.

Fabricius, in his last work, the *Systema Entomologica Emendata*, has obscured this genus in a way that it will not be easy to unravel. He has given an *Oestrus Bovis*, with a description nearly corresponding to the true one, "*alis immaculatis*," &c. but immediately refers to the Linnæan *Bovis* "*alis maculatis*," and continues the Linnæan references. Under the title of *Equi* is described the Œ. *veterinus*, under which the *hæmorrhoidalis* is introduced as a variety β! So that a description of the true Œ. *Equi*, the most frequent and strongly marked of this genus, is altogether omitted, as a distinct species; at the same time the variety of it β of my account and of the Linnæan *Fauna* is presented as a distinct species, under the extraordinary title of Œ. *Vituli*; and beneath it is a reference to the true *Equi* in Geoffroy. The Œ. *Pecorum* of this author is most probably a dark-coloured variety of the Œ. *veterinus*, or it may be altogether a new species.

The

The commission of errors like these, in a genus whose species had been more numerous, might have defied the possibility of detection, while the patient investigator might endeavour to understand them with unavailing labour.

Nor can I observe without regret, in this respectable work, such a direct abuse of the intention of *Synonyma*, which, far from assisting as auxiliaries to the description, which they ought always to do, serve only to perplex by their perfect disagreement.

Vallisneri has given in the Italian language a very extensive account of the Œ. *Bovis* and *Ovis*, with many curious quotations from the Italian poets and the ancients. Ragionamento intorno all' Estro de Buoi. *Opere*, tom. i. p. 225.

Reaumur has also been very copious in his account of the Œ. *Bovis* and *Ovis*, and has given a description of the *hæmorrhoidalis*, but appears not to have been acquainted with the Œ. *Equi*. *Histoire des Insectes*, tom. iv. p. 503.

OESTRUS. *Antennæ* articulis tribus, ultimo subgloboso setâ anticè instructo, in foveis duabus frontis demersæ.

*Os* apertura simplex, neque ullo modo exsertum.

*Palpi* duo, biarticulati, apice orbiculares in depressione oris utrinque siti *.

1. *Bovis.* Œ. alis immaculatis fuscis, abdomine fasciâ atrâ mediâ: apiceque pilis fulvo-flavis.

*Vallisneri Opere, tom.* i. *tav.* 28. *f.* 10. *Larva* 1, 2, et seq.

* Facies hujus generis muscarum omnino peculiaris est, lata, depressa, vesiculosa, glauca, et antennis in capite altè immersis. Frons etiam faciem quadrupedis nonnihil simulat, præsertim Simiæ; hoc in Œ. *hæmorrhoidali* maximè conspicuum est.

*Reaumur, Hiſt. Inſ. tom.* iv. *p.* 503. *tab.* 38. *f.* 7, 8.
*De Geer, Hiſt. Inſ. tom.* vi. *p.* 297. *pl.* 15. *fig.* 22.
*Schaeffer, Inſ. Ratiſbon. tab.* 89. *f.* 7.
*Fiſcher, Diſſert. inaug. tab.* 3. *fig.* 5.
*Anglis, Breeze, Brize*, or *Gad-fly.*
*Habitat* in paſcuis, inter armenta, in quorum dorſo deponit ova.
*Deſcr.* Œ. Equo vix major, fronte albâ, undique tomentoſâ. *Thorax* anticè flaveſcens, in medio ater, lineis denudatis longitudinalibus quatuor, poſticè cinerea. *Abdomen* baſi cinereum faſciâ ſ. cingulo in medio atro, apiceque pilis fulvo-flavis. *Squamæ Halterum* magnæ niveæ convexæ. *Pedes* nigri, tarſis pallidis.
*Fœminæ* abdomen, ſtylo attenuato atro, compreſſione evolvendo.
*Larva* ſubcutanea, apoda, fuſca, undecim ſegmentorum, lineis tranſverſis, ſcabris, interruptis.

2. *Equi.* Œ. alis albidis, faſciâ mediâ punctiſque duobus nigris.
Œ. *Bovis.* Alis maculatis thorace flavo faſciâ fuſcâ, abdomine flavo apice nigro. *Linn. Syſt. Nat. p.* 969. 1. *Faun. Suec.* 1730.
Œ. *Bovis. Fabricii Species Inſect. p.* 398.
Œ. *hæmorrhoidalis. Gmelin. Syſt. Nat. p.* 2810.
*De Geer, Hiſt. Inſ. p.* 291. *pl.* 15. *fig.* 16.
*Geoffroy, Hiſt. Inſ.* 2. *p.* 456. *n.* 3.
*Habitat* inter jumenta in pratis, deponit ova in genubus et lateribus equorum.
*Deſcr. Frons* alba, tomentoſa, vertice fuſco. *Oculi*

nigri, distantes. *Thorax* fuscus, in medio obscurior. *Abdomen* flavo-fuscum maculis punctisque incisurarum nigris. *Scutellum* fasciculis duobus pilosis. *Alæ* basin versus puncto minimo atro, fasciâ mediâ, apiceque maculis duabus nigris.

*Mas* flavo, fœmina fusco colore saturatior, apiceque abdominis elongatâ incurvatâ atrâ, stylo bifido terminali.

β *varietas.* Apice alarum maculâ unâ tantùm oblongâ et abdomine tecto pilis densis, fuscoferrugineis. Specimen vidi in Musco Linneano quod certè varietas β Faunæ Suec. 1730.

Œ. *Vituli. Fabricii Syst. Ent.* 6. *p.* 231.

*Larva* teres, viridis, caudâ obtusè truncatâ, capite attenuato ore longitudinali corneo labiis duobus. Unguiculis duobus utrinque oris recurvatis atris. Marginibus segmentorum spinis rigidis deorsum spectantibus duplici serie obsitis. In ventriculo equorum nutrita, et ad maturitatem perducta, tandem ano emissa, in humum decidit.

3. *hæmorrhoidalis.* Œ. Alis immaculatis fuscescentibus abdomine atro, basi albo apiceque fulvo.

Œ. *hæmorrhoidalis.* Alis immaculatis thorace nigro: scutello pallido, abdomine nigro, basi albo apiceque fulvo. *Linn. Syst. Nat.* 2. 970. *Faun. Suec.* 1733.

Œ. *Equi* β *Fabricii Syst. Ent. t.* 6. *p.* 232.

Œ. *Bovis*

Œ. *Bovis.* *Gmelin. Syſt. Nat.* 4. *p.* 2809.
*Reaumur, Hiſt. Inſ. tab.* 35. *f.* 3. *Larva, t.* 34. *fig.* 14.
*Geoffroy, Hiſt. Inſ.* 2. *p.* 455. *n.* 1.
*Habitat* in paſcuis, deponit ova in labiis equorum.
*Deſcr.* Œ. Equo dimidio minor. *Frons* alba tomentoſa. *Thorax* pilis fuſcis ſpatio inter alas atro. *Abdomen* atrum baſi albis apiceque pilis fulvis. *Subtus* piloſus, cinereus, femoribus nigris, pedibuſque ruſis.
*Fœminæ* abdomen apice elongatum, incurvatum, atrum.
*β variat* ſquama halterum majori lacteâ magnâ ac facie magis depreſſâ.
*Larva* minor aliter ſimillima priori.

4. *veterinus.* Œ. ferrugineus alis immaculatis, lateribus thoracis, abdomineque baſi pilis albis.
Œ. *naſalis.* Alis immaculatis, thorace ferrugineo, abdomine nigro pilis flavis. *Linn. Syſt. Nat.* 969. 3. *Faun. Suec.* 1732.
Œ. *Equi.* *Fabricii Syſt. Ent.* 6. *p.* 232.
Œ. *naſalis.* *Gmelin. Syſt. Nat.* 4. 2811.
*Habitat* in paſcuis. *Larva* in Equis aliiſque veterinis.
*Deſcr.* Œ. Equo minor. *Caput, thorax*, et *abdomen* pilis ferrugineis tecta. *Alarum* ortus abdominiſque baſis pilis albis obſita. *Abdomen* quam in reliquis magis gibboſum ſegmento ſecundo

Linn Trans III. tab 23. p. 329.

Syd. Edwards, del. et sculp.

cundo tuberculis duobus hirtis. *Subtus* ferrugineo-fuscus—Pedes etiam ferrugineo-fusci.

β *Variat* præcipue fœmina abdomine pene atro.

5. *Ovis.* Œ. Alis pellucidis basi punctatis abdomine albo nigroque versicolore.

Œ. *Ovis.* Alis subpunctatis abdomine albo nigroque versicolore. *Linn. Syst. Nat. p.* 970. 5.

Œ. *Ovis. Fabricii Syst. Ent.* 6. *p.* 232.

Œ. *Ovis. Gmel. Syst. Nat. p.* 2811.

*Vallisneri Opere, tom.* 1. *tav.* 27.

*Reaumur, Hist. Inf. tab.* 35. *f.* 22. *Larva* 8, 9.

*Geoffroy, Hist. Inf.* 2. *p.* 456. *n.* 2.

*Habitat* inter pecora; deponit ova in margine narium interiori.

*Descr.* Œ. Equo minor, pilis scatentibus paucis, vertice capitis punctis excavatis. *Thorax* cinereus punctis elevatis atris, setigeris, lineisque quatuor nigris. *Abdomen* colore albido-cinereum nigro maculatum fugaci. Supra aperturam oris processu parvo conico.

*Larva* alba ovata, anticè acuminata unguiculis duobus, posticè truncata margine prominenti et squamulis duabus atris respiratoriis. *Supernè* convexa lineis punctisque nigris. *Subtus* plana in medio segmentorum punctis asperis atris minutis notata.

*Habitat* intra cavos frontis ovium, evaditque per nares.

XXVII. *Characters of a new Genus of Plants named* SALISBURIA. *By James Edward Smith, M.D. F.R.S. P.L.S.*

*Read December* 6, 1796.

## SALISBURIA.

MONOECIA *Polyandria.*

CHAR. GEN.

MASC. *Amentum* nudum, filiforme. *Antheræ* incumbentes, deltoideæ; loculis apice tantum connexis.

*Fœm.* ſolitarii. *Calyx* 4-fidus, perſiſtens. *Drupa* ſupera, globoſa, putamine triangulo. *Semen* albuminoſum, bicotyledoneum.

SALISBURIA *adiantifolia.*

Ginkgo, vel Ginan, vulgo Idſio, arbor nucifera, folio adiantino. *Kæmpf. Am. Exot.* 811, cum icone.

Ginkgo biloba. *Linn. Mant.* 313.

Ginko biloba, foliis Adianti. *Thunb. Fl. Jap.* 358.

DESCR. FRUCT. *Pericarpium, Drupa* pallidè fuſca, ſupera, globoſa; *caro* dura, craſſa, putamini arctiſſimè cohærens; *putamen* tenue, oſſeum, ovale, triangulum, glabrum, apice acutum, uniloculare. *Semen* ſolitarium, ovale, baſi anguſtatum, magnitudine ferè putaminis; *integumenta* duo, fuſca, membranaceâ;

branacea; alterum putamini adhærens, alterum ſemini; *albumen* vireſcente-album, ſemini conforme, amygdalinum; *embryo* luteus, baſi albuminis inſertus, rectus, bicotyledoneus.

This is a large not inelegant tree, cultivated in China and Japan. The nuts are eatable, and ſweet, but not produced till the tree arrives at a conſiderable age; nor has it been long enough in England to attain a ſufficient degree of maturity. The male flowers however have been obſerved for theſe two years paſt, early in the ſpring, in Kew gardens. The tree itſelf has long been admired for its handſome fan-ſhaped leaves, cloven about half way from their ſummit; but they can by no means be termed *biloba*, or two-lobed, as that denomination requires the ſegments ſhould be rounded. Theſe leaves are alſo irregularly notched like thoſe of the *Zamiæ*, thickened at the margin, ſmooth, ſtriated on each ſide with numerous parallel nerves.

The genus is named in honour of *Richard Anthony Saliſbury, Eſq. F.R.S.* and *F.L.S.* of whoſe acuteneſs and indefatigable zeal in the ſervice of botany no teſtimony is neceſſary in this ſociety, nor in any place which his writings have reached.

*Saliſburia* ſhould be placed in the Linnæan ſyſtem between *Quercus* and *Juglans*. In that of M. de Juſſieu it belongs to the fifth order of his 15th claſs, after *Taxus*, though it is not very nearly allied to any genus whatever. I have preferred *adiantifolia* for a ſpecific name, becauſe *biloba* is not correct, and *adiantifolia* has not only been uſed long ago by Kæmpfer and Thunberg, but is peculiarly appoſite in this caſe; my friend whoſe name I wiſh the plant in queſtion to perpetuate, having diſtinguiſhed himſelf by the application of ſuch comparative ſpecific names, and preferring them to all others.

The generic name of *Ginkgo*, being equally uncouth and barbarous, was retained by Linnæus in an Appendix, only till the flowers ſhould be diſcovered, and the plant referred to its proper place in the Syſtem.

XXVIII. Ex-

## XXVIII. Extracts *from the* Minute Book *of the Linnean Society.*

*July* 2, 1794. The President communicated an account of *Merops Apiaster*, the Bee-eater, having been ſhot (for the firſt time in Great Britain) near Mattiſhall in the county of Norfolk, by the Rev. Mr. George Smith. The identical ſpecimen was exhibited, by permiſſion of Mr. Thomas Talbot of Wymondham. A flight of about twenty was ſeen in June, and the ſame flight probably (much diminiſhed in numbers) was obſerved paſſing over the ſame ſpot in October following.

*Dec.* 2. A ſpecimen of *Tamarix gallica*, gathered in a wild ſtate on St. Michael's Mount, Cornwall, by W. G. Maton, Eſq. F.L.S. was preſented to the Society.

*June* 2, 1795. Specimens of ſeveral rare native plants of Scotland, from Profeſſor James Beattie, junior, of the Mareſchal College, Aberdeen, were preſented by the Preſident, and among them *Linnæa borealis*, diſcovered by that gentleman, for the firſt time in Britain, in an old fir wood at Mearns near Aberdeen.

*May* 3, 1796. Mr. Fairbairn preſented a living ſpecimen of a *Ruſcus*, which, though long cultivated in Chelſea garden, has been hitherto overlooked by botaniſts as a variety of the *aculeatus*. Being referred to the Preſident for examination, it was returned with the following name and character:

Ruscus

RUSCUS *laxus.*

Foliis ellipticis utrinque acutis mucronato-pungentibus ſupra floriferis nudis, ramis laxis.

The ſpecific character of the common *Ruſcus aculeatus* muſt be altered to

Foliis ovatis mucronato-pungentibus ſupra floriferis nudis, ramis ſtrictis.

*Jan.* 3, 1797. The following extract of a letter from the Earl of Altamont to A. B. Lambert, Eſq. V.P.L.S. was read to the Society.

" There were formerly in Ireland two kinds of wolf-dogs, " the greyhound and the maſtiff. Till within theſe two " years I was poſſeſſed of both kinds, perfectly diſtinct and " eaſily known from each other. The heads were not ſo " ſharp in the latter as in the former, but there ſeemed a " great ſimilarity of temper and diſpoſition, both being " harmleſs and indolent. The painting in your poſſeſſion " is of the maſtiff wolf-dog." [See tab. 3, of the preſent " volume.]

" I have at preſent five wolf-dogs remaining, three males " and two females; in theſe the two ſorts appear to be " mixed. The dam was of the maſtiff, the ſire, if I am not " miſtaken, was of the greyhound kind. The ſire and dam " had not dwindled in ſize from any that I remember here. " Thoſe which now remain are too young to judge of. " We have an old man here, named Bryan Scahil, now in " his 119th year, whoſe memory ſeems accurate, and all " his faculties complete. He perfectly remembers the hunting of wolves in Ireland, as a common matter of ſport, " and

" and informs me that the uſage was to collect all the dogs " of every ſort in the neighbourhood, and to borrow wolf- " dogs from the principal gentlemen, who alone had them, " and who uſually aſſiſted in the chace. A tenth part of " the dogs uſed were not wolf-dogs, which never were in " any number in the hands of the common people. I con- " ceive alſo that theſe dogs having *no noſe*, other kinds were " neceſſary to find the game and follow the ſcent of it. " Scahil deſcribed wolves with ſuch perfect accuracy, I " have no doubt of his being well acquainted with the " animal."

At the ſame time Mr. Lambert preſented to the Society ſpecimens of the new kind of Bark from Tecamez in South America (with a whole tree of the ſame), deſcribed by him in his Account of the Genus *Cinchona*, lately publiſhed.

*April* 4, 1797. Mr. Lambert exhibited a drawing of the *Ardea comata*, var. *β*, of Latham, ſhot at Boyton in Wiltſhire, near a river, by Edmund Lambert, Eſq. in the year 1775, ſuppoſed to be the only one of the kind ever found in England.

END OF THE THIRD VOLUME.